

## **Historic, Archive Document**

Do not assume content reflects current scientific knowledge, policies, or practices.



281.9  
Ag 8F  
cop 3

Foreign Agricultural Economic Report No. 115

~~DSB/DSB~~

Copy 3

# WORLD FERTILIZER REVIEW AND PROSPECTS TO 1980/81

Richard B. Reidinger



PRODUCTION SECTION  
CURRENT SERIAL RECORDS

FEB 25 '61

U.S. DEPARTMENT OF AGRICULTURE  
WORLD AGRICULTURAL LIBRARY  
GAINESVILLE, FLORIDA

### ABSTRACT

This report reviews the major events leading up to the extremely tight market conditions of 1973/74, and discusses the factors behind the rapid reversal of the world fertilizer situation which occurred in 1974/75. It presents estimates of the current and expected regional and world fertilizer supply-demand situation to 1980/81, for nitrogen, phosphate and potash separately. The current and expected phosphate rock situation is also examined.

Key Words: fertilizer, nitrogen, phosphate, potash, phosphate rock.

### NOTE

Because of wide interest in the current world fertilizer situation, this report is being distributed to several mailing lists in addition to recipients of Foreign Agricultural Economic Reports. Therefore, some persons may receive duplicate copies.

This report was prepared to update an October 1974 study by the Economic Research Service, *World Fertilizer Situation: 1975, 1976 and 1980*, and to review the fertilizer situation in light of recent events and changes. These aggregate data and results should be considered preliminary, particularly for 1974/75. FAO-collected data for 1974/75 will be available in the next few months. In addition, the presentation of more detailed preliminary country data supplied by Foreign Agricultural Service agricultural attaches and Economic Research Service country analysts is planned shortly in a separate report.

# WORLD FERTILIZER REVIEW AND PROSPECTS to 1980/81

by  
Richard B. Reidinger  
Foreign Demand and Competition Division  
Economic Research Service

## CONTENTS

	<i>Page</i>
Summary . . . . .	3
Introduction	
Objectives and Methodology . . . . .	4
Background and Review of Situation . . . . .	6
Current Situation and 1976/77 Outlook . . . . .	9
Nitrogen . . . . .	9
Phosphate . . . . .	11
Potash . . . . .	13
World Fertilizer Prospects to 1980/81	
Nitrogen . . . . .	15
Phosphate . . . . .	18
Potash . . . . .	20
Phosphate Rock	
Current Situation . . . . .	24
Demand and Production . . . . .	24
Trade . . . . .	24
Structure of Phosphate Rock Production and Trade . . . . .	25
Phosphate Rock Prices . . . . .	26
Outlook . . . . .	27
Expected Phosphate Rock Capacity . . . . .	27
Phosphate Rock Resources . . . . .	27
Appendix A: Projections of the FAO/UNIDO/ World Bank Working Group on Fertilizers	
Projections . . . . .	29
Methodology . . . . .	29
Capacity . . . . .	29
Production and Available Supply . . . . .	29
Demand . . . . .	29
Regional Groupings . . . . .	29
Appendix B: Preliminary Data on 1974/75 Fertilizer Consumption in Major Countries . . . . .	33

## SUMMARY

In 1974, fertilizer was in short supply. Driven by strong demand and limited production capacity, prices rose to record levels. After heavy financial losses in the late 1960's, new plant capacity was inadequate to meet this strong demand resulting from widespread crop shortfalls, record high grain prices, and international projections indicating continued fertilizer shortages and rising prices. Panic and speculative buying in the face of forecast shortages exaggerated both actual shortages and price rises. Many countries, particularly developing countries, imported fertilizer at such high prices their farmers could not afford to use it.

In 1975, shortages disappeared and prices fell rapidly due primarily to weak demand. Fertilizer consumption fell substantially in several major countries, including the United States, France, and India. Only in the centrally planned countries as a group did fertilizer consumption grow at roughly historic rates. Inventories in both exporting and importing countries rose rapidly. With high inventories and weak domestic demand, many developing countries began to reduce fertilizer imports. India, Brazil, Indonesia, and the Philippines embargoed fertilizer imports. The Fertilizer Association of India has proposed extension of the Indian embargo for three years on nitrogen and phosphate.

Continuing this trend in 1976, adequate fertilizer supplies and reasonable prices are expected. Continued weakness in demand for nitrogen and phosphate is likely if grain prices continue weak or decline further, or until large inventories are reduced, particularly in the developing countries, which account for roughly two-thirds of world nitrogen imports and about half of world phosphate imports. However, at present the estimated world balance is still close, especially for nitrogen. The situation in the short term could tighten rapidly with a strong revival of demand.

Overall, though, a recurrence of tight world market conditions for fertilizer seems unlikely over the next few years to 1980/81. World capacity, par-



ticularly for nitrogen and phosphate, will increase substantially. Current projections indicate continuing improvement of the world fertilizer supply-demand balance until the late 1970's. These expectations could be altered if: (1) enough of the announced new capacity is canceled due to low fertilizer prices; (2) the developing countries raise their fertilizer consumption more rapidly than expected in their efforts to close their food gap; or (3) the developing countries fail to expand fertilizer production as much as they now predict. Such expansion in the developing countries depends on their ability to complete new plants on schedule and operate them efficiently.

Between now and 1980/81, the developing countries will steadily increase their share of world fertilizer consumption and especially production, while the developed countries' share will drop. Particularly in the developing countries, growth rates for fertilizer production will exceed those for consumption, and several major developing countries will approach or achieve self-sufficiency in nitrogen and phosphate, in particular the three largest fertilizer importers, China, India, and Brazil. Indonesia, Mexico, Venezuela, and the several Middle East countries will become significant

exporters. Current projections indicate that by 1980/81 the developing countries as a group will greatly reduce their import dependence for nitrogen and eliminate it for phosphate fertilizer products, although their imports of potash will roughly double.

The future potash situation is much less clear, primarily because of the Saskatchewan government's recently announced decision to nationalize the Canadian potash industry which dominates world potash trade. What happens next is vitally important to the United States, which imports nearly three-fourths of its potash from Canada. Due to large inventories, supplies this year should be adequate, but future renovation and expansion of Canadian potash capacity will depend directly on government decisions, not market forces. Especially compared with other fertilizers, potash prices have remained relatively reasonable during the last few years. Recent statements by the Saskatchewan government, however, indicate it wants higher returns to the province from potash exports. Perhaps more than Morocco with phosphate rock, Saskatchewan appears to have the power to effectively set potash export prices above competitive levels.

## INTRODUCTION

In 1974, fertilizer shortages were partly blamed for lagging world food production particularly in the developing countries, while in 1975 the situation changed, and many of these same countries restricted fertilizer imports. In the space of 4 or 5 years, world trade prices of some fertilizers such as urea have increased 700 to 800 percent (figure 1). From mid-1973 to mid-1974 alone, world prices of several important fertilizers increased about 400 percent. By mid-1974 fertilizers badly needed for import by the developing countries were often unavailable on world markets, even at record prices. But in late 1974, prices had begun to fall, and by mid-1975, producers were beginning to complain about declining prices. Meanwhile, prices for phosphate rock, which is required for most of the world's phosphate fertilizer production, rose almost 400 percent in the first half of 1974, and officially remained at record levels throughout 1975 in the face of weak demand and reduced production.

Mainly in response to the severe fertilizer shortages felt by the developing countries in 1973 and particularly 1974, the Food and Agricultural Organization (FAO) of the United Nations has sponsored several international meetings devoted primarily to the developing countries problems in obtaining their fertilizer supplies on world markets. These meetings, as well as industry and

organizations like the World Bank, the U.N. Industrial Development Organization (UNIDO), the National Fertilizer Development Center at the Tennessee Valley Authority (TVA), and the U.S. Department of Agriculture (USDA), have produced significantly different fertilizer projections, some warning of deficits and production gaps, and others of possible overcapacity. Thus, the last 2 years have witnessed large and rapid changes in the world fertilizer situation, evidently with the causes and direction of change, much less its magnitude, generally not clearly defined or understood.

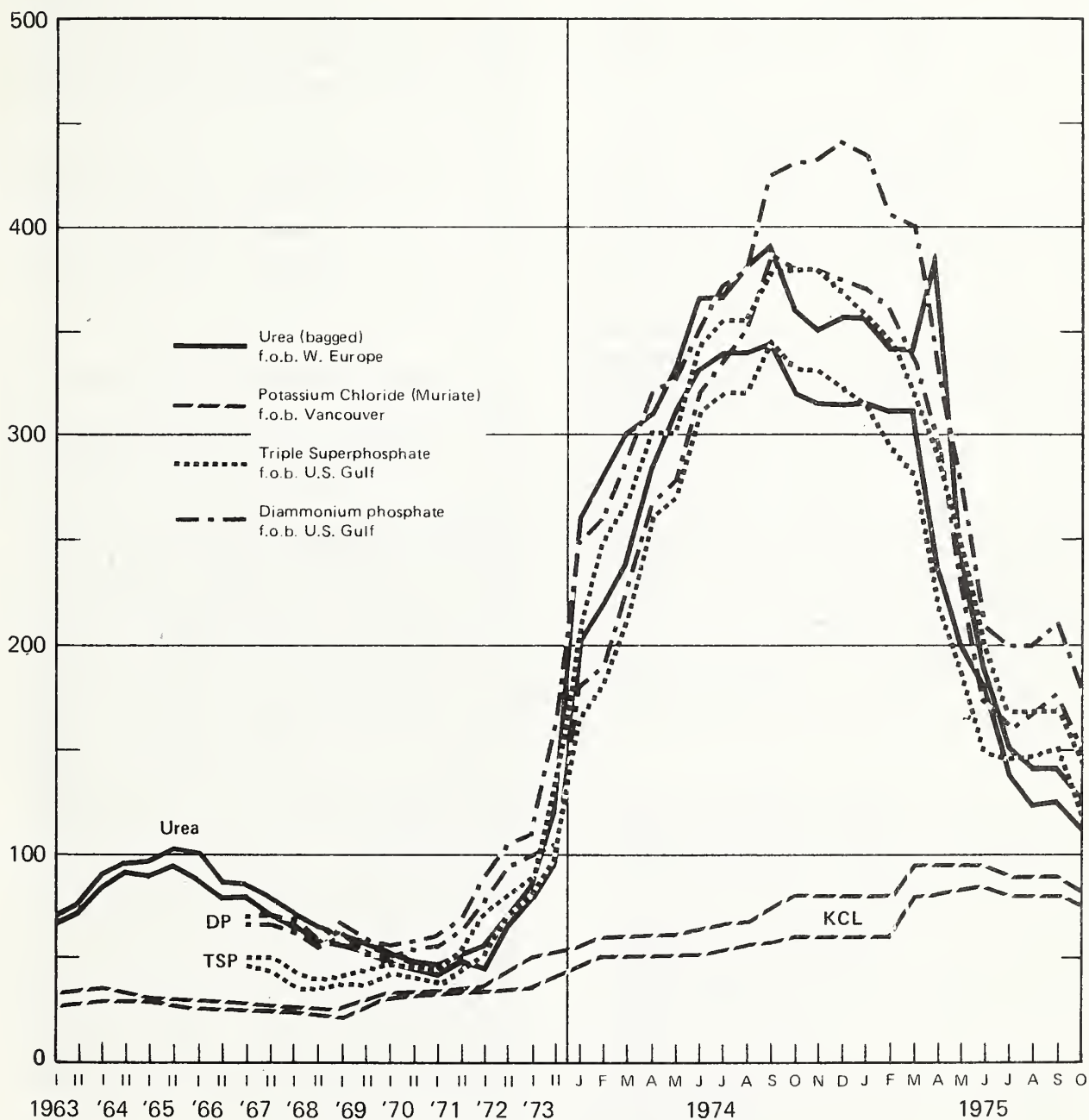
## Objectives and Methodology

The objectives of this report are to provide a review of recent events leading up to the present world fertilizer situation; preliminary data and analysis on world fertilizer supply and demand in 1974/75 and the outlook for 1975/76 and 1976/77; projections of world fertilizer supply and demand to 1980/81; and a brief analysis of the current and expected phosphate rock situation.

World and regional fertilizer supply and consumption estimates used here are based on projections developed by the FAO/UNIDO/World Bank Working Group on Fertilizers in April 1975 and

# EXPORT PRICES FOR SOME MAJOR FERTILIZER MATERIALS

(U.S. \$ per metric tons of product)



THE DOUBLE LINES INDICATE THE PRICE RANGES FOR EACH PRODUCT.

Figure 1  
Source: World Bank, Fertilizer Unit.

presented at the Second Session of the Commission on Fertilizers in June 1975.<sup>1</sup> However, estimates for 1973/74 and 1974/75 include USDA estimates of U.S. supply and apparent consumption to reflect the rapidly changing U.S. fertilizer trade balance.<sup>2</sup> Capacity projections were updated by the Working Group in October 1975, but they do not change the general conclusions of this report regarding future fertilizer supply and demand.

World supply projections are based on 1973/74 existing capacity plus country by country expected future capacity according to announced new plants and expansions under construction, contracted, or planned and are reasonable expectations of supply capability. Actual supply produced, of course, depends on demand. In general, fertilizer supply capability is estimated by assuming specified levels of industrial use by plant, country, or region; technical losses; expected maximum operating rates generally by country or region; and reduced operating rates for new plants by country or region.

Consumption estimates are based on effective demand. Effective demand takes into account constraints influencing fertilizer use in various countries, such as crop and fertilizer price policies; farm income; farm credit availability; transportation, distribution and marketing bottlenecks; and complementary input availability. Fertilizer consumption projections are based on past trends adjusted for factors such as the above, and are not functionally related to fertilizer price levels. And most specifically, they are not based on fertilizer use requirements to meet food production needs or targets for particular countries.

Individual country data are based on a survey of U.S. agricultural attache posts in 47 countries in May 1975 followed by a short update survey in November. These country data were then reviewed

---

<sup>1</sup>See FAO, "Longer-Term Fertilizer Supply/Demand Position and Elements of a World Fertilizer Policy," AGS: F/75/7, May 1975; Commission on Fertilizers, 2nd Session, Rome, June 3-7, 1975, pp. 21-27. In addition to the organizations named above, the working group included representatives from industry, NITREX (the marketing organization of nitrogen producers in 6 European countries), the International Superphosphate Manufacturers' Association (ISMA), the International Potash Institute, TVA, the Economic Research Service, and The Fertilizer Institute. See Appendix A for the complete 1974/75 to 1980/81 projections of the Working Group, and a more detailed note describing the projections methodology used.

<sup>2</sup>Apparent consumption equals production, plus imports, minus exports. Apparent consumption in 1974/75 in the United States exceeded reported field consumption by 1.4 million tons of nitrogen, 0.8 million tons of phosphate, and 0.5 million tons of potash. The discrepancy was well above 1973/74 levels and probably indicated unusually large inventories at the retail and farm level which are not measured.

and supplemented as necessary by ERS country analysts. U.S. data are drawn from ERS, the Agricultural Stabilization and Conservation Service of USDA, and the Department of Commerce. The agricultural attache survey attempted to provide current information which is presently unavailable through official published sources, primarily the FAO, and was undertaken in both 1974 and 1975. Unfortunately not all countries have agricultural attaches, and thus the building up of world aggregate estimates directly from these data is not possible. Other major data sources include the FAO, the World Bank's Fertilizer Unit, TVA, The Fertilizer Institute, ISMA, and the British Sulphur Corporation.

Except as noted, all data use the metric system, are on a nutrient basis, and are based on the July-June fertilizer year. Following the FAO convention, countries reporting fertilizer data on a calendar year basis correspond to the first part of the split year. The regional economic classifications also follow the FAO standard.

## Background and Review of Situation

Following several years of depressed industry profits or losses due to overcapacity in the late 1960's, international fertilizer prices began to climb in late 1971. By October 1973, world prices for some commonly traded products like urea and triple superphosphate had doubled or tripled from their previously depressed levels. The worsening world fertilizer situation was particularly severe for the developing countries which produce only 60 percent of the fertilizer they use, and which were paying \$125 to \$150 per ton to import urea that in the previous year had cost them as little as \$50 per ton. Faced with record high world grain prices stimulated by strong world food demand including the massive Soviet grain purchases and widespread crop failures, the food-importing developing countries were desperately trying to raise their domestic food production, and fertilizer was a key input. In October 1973, the FAO called an Inter-governmental Consultation on Fertilizers which focused on the developing countries' problems in paying for and obtaining the high priced fertilizers they needed.

Meanwhile in the United States, the world's largest producer and consumer of fertilizer, government price controls imposed in August 1971, had masked these changes in world fertilizer markets in the early 1970's. U.S. domestic fertilizer prices remained stable, and the differential between U.S. and world fertilizer prices widened. U.S. net exports of nitrogen and phosphate fertilizers, which had declined since their peak during the over capacity period of the late 1960's, began to



climb.<sup>3</sup> Perhaps because the U.S. phosphate industry had historically depended heavily on exports while the nitrogen industry had not, phosphate exports responded to the world-U.S. price differential more rapidly. U.S. net exports of phosphate began to climb again in 1970/71, and of nitrogen in 1971/72. U.S. phosphate producers also began to plan new plants somewhat sooner than nitrogen producers.

By October 1973, fertilizer exports were booming, while U.S. domestic fertilizer demand was rising rapidly. In 2 years, net exports had more than tripled for nitrogen and doubled for phosphate. At the same time, U.S. farmers saw grain prices skyrocket after the massive Russian grain purchases in 1972/73. High grain prices and low domestically controlled fertilizer prices drove the quantity of fertilizer demanded up rapidly. However, due to lack of new capacity, the industry was unable to meet the demand, and many U.S. farmers were reportedly unable to obtain all the fertilizer they wanted.

Faced with shortages at home and exploding exports, the U.S. Cost of Living Council in late October 1973 decontrolled fertilizer prices. In return, the industry agreed to increase fertilizer supplies significantly for the U.S. domestic market. Since production, particularly of nitrogen, was limited by fixed capacity, much of the increase obviously would have to come from decreased exports or increased imports or both.

Net U.S. domestic supplies in 1973/74 increased by 13 percent for nitrogen and 5 percent for phosphate. Net exports dropped 60 percent for nitrogen and rose only slightly for phosphate. U.S. producers found ready markets at home even as domestic prices doubled and credit terms tightened. Decontrol of U.S. fertilizer prices allowed U.S. farmers, with a 70-percent increase in net farm income in 1973, to compete effectively on world markets for available fertilizer supplies, and compete they did.

Complicating the situation was the 1973 international oil embargo and vastly increased oil and energy prices, particularly since most nitrogen production is directly dependent on hydrocarbon feedstocks like naphtha, oil, and natural gas. Although the increased energy costs themselves were not directly responsible for the record fertilizer prices, increased energy costs certainly raised costs of production; they will have a substantial impact as market prices settle toward long-term equilibrium levels. In addition, supply interruptions and increased costs for oil and naphtha may have lim-

ited nitrogen production in late 1973 and early 1974, particularly in countries like Japan and India which depend heavily on energy imports.<sup>4</sup>

A further difficulty faced by many countries, particularly in West Europe which is a major exporter of fertilizers, was the increased price of phosphate rock. Morocco assumed price leadership in world phosphate rock trade, and during roughly the first half of 1974, Morocco increased its rock export price from \$14 to \$68 per ton, thus adding nearly \$100 directly to the production cost of phosphoric acid, the basic intermediate for many phosphate fertilizers.<sup>5</sup>

Meanwhile, the plight of the developing countries was growing more desperate. Their import bill for oil, vital for their development, had increased by nearly 400 percent. Several of the largest of these countries, including India and Bangladesh, suffered reduced food output, necessitating huge increases in food grain imports at prices roughly three times the level of previous years. All this occurred during a period of drastic reduction in food aid programs. Similarly, the budgetary resources of bilateral fertilizer aid programs often did not keep pace with rising prices, thus reducing tonnage available through such aid. And at times, the needed fertilizers were simply unavailable on the market.

The first meeting in July 1974 of the FAO Commission on Fertilizers reflected the serious world fertilizer situation, particularly for the developing countries, as did several reports which appeared early in 1974.<sup>6</sup> At the Commission meeting, data and projections on the fertilizer situation presented by the FAO<sup>7</sup> and the World Bank<sup>8</sup>, both with major roles in the third world, further added to the developing countries' concerns. The FAO projected a world deficit of 417,000 tons of nitrogen in 1974/75, growing to over 1 million tons in 1975/76 and over 7 million tons by 1980/81; the phosphate deficit was expected to reach 4.6 million nutrient tons by 1980/81. Most significantly, much of the deficit was expected to occur in the developed countries which historically had produced surpluses. According to these projections "...the

<sup>4</sup>About 99 percent of Japan's oil, which furnishes feedstock for most of its nitrogen industry, is imported. About 70 percent of India's nitrogen production depends on naphtha, most of which is imported.

<sup>5</sup>TVA, *World Fertilizer Market Review and Outlook*, March 1974, Figure B-12, p.65, relates phosphate rock prices and production costs.

<sup>6</sup>TVA, *World Fertilizer Market Review and Outlook*, March 1974; and ERS, *United States and World Fertilizer Review and Outlook: 1974 and 1980*, March 1974.

<sup>7</sup>FAO, *Review of Current Market Situation, Trends, and Prospects for Fertilizer Supplies and Prices*, AGS; F/74/2, June 1974, Commission on Fertilizers, First Session, July 2-5, 1974.

<sup>3</sup>The United States is a net importer of total fertilizer nutrients due to massive potash imports from Canada, totaling roughly three-fourths of U.S. potash consumption in 1973/74.

ammonia shortage can be expected to extend until 1976/77 if not 1977/78," and "Africa and North America will be the only major regions with a considerable surplus of phosphate until 1980/81, but by no means can meet the demand of the deficit areas."<sup>9</sup> Projections by the World Bank further reinforced these conclusions, indicating a production gap (deficit) of 8.4 million tons of nitrogen and 3.8 million tons of phosphate by 1980/81, and most significant, assuming the developing countries would become major suppliers of the developed countries.<sup>10</sup>

These projections were developed largely before the massive 1974 boom in fertilizer plant investment had become evident. In fact, a World Bank representative at the meeting presented more recent data indicating the emerging investment trends. The relatively small shortage of 1974 was likely to become a surplus in the next few years, and the critical issue was how to make effective use of the expected new fertilizer supplies.<sup>11</sup>

Unfortunately, in the panic atmosphere prevailing at the meeting these changes in the world outlook received scant attention, particularly among developing countries trying to obtain as much assistance as possible. Most significantly, on the basis of the earlier projections, many developing countries believed the shortage situation would remain or worsen, and they decided to hedge against future shortages by buying more fertilizer. Their increased demand helped push prices to new highs, peaking in roughly September 1974 at about \$340 to \$380 per ton for urea, \$340 to \$370 for triple superphosphate, and over \$400 per ton for diammonium phosphate.

In 2 years world fertilizer prices had risen substantially for most products. Nevertheless, the prices applicable to the bulk of world fertilizer deliveries (represented by all domestic deliveries and a large portion of those entering export markets) were substantially lower than the peak prices which may be termed distress purchases.<sup>12</sup> These distress purchases tended to balance the distress sales in the late 1960's, when 20 percent of the U.S. industry was closed by near bankruptcy. According

to the Kuwait industry representative at the 1974 Commission on Fertilizers, 1973 was the first year his country's producers had made a profit since commencing production in 1967.

After peaking in late summer 1974, fertilizer prices trended downward in the fall of 1974. Due to some increased capacity and high operating rates, 1973/74 fertilizer production had increased slightly more than the annual average of the previous 5 years.<sup>13</sup> And the worldwide recession had reduced industrial use of fertilizer materials such as ammonia and urea, thus increasing supplies for agriculture. But perhaps the major change occurred in fertilizer demand. The high prices had simply eliminated many developing countries from the market. Further, farmers in countries ranging from the United States to India resisted record high prices. U.S. producer inventories began to climb in October 1974. By June 1975, producer inventories of nitrogen and phosphate fertilizers were more than double the June 1973 levels; stocks of urea, triple superphosphate, and diammonium phosphate, major fertilizers in international trade, were about three times the 1973 level.<sup>14</sup>

The U.S. farmer's predicament was illustrative. In early 1975, wheat and corn prices trended downward, and cotton prices declined to roughly their previous normal levels. Credit was expensive. Farmers' input prices including fertilizer had gone up and remained at high levels, and net farm income, though still high, had fallen by nearly 20 percent since 1973. U.S. farmers no longer faced acreage restrictions, and many had invested in more and larger machinery. Under these conditions—particularly the risk of lower product prices, higher fixed investment costs, and uncertain weather—it seemed likely that farmers might reduce fertilizer use, while maintaining crop production at high levels.<sup>15</sup>

As a result, total U.S. fertilizer consumption declined more than 9 percent in 1974/75.<sup>16</sup> In Western Europe, recent reports indicate nitrogen consumption rose very little and may have fallen,

---

<sup>9</sup>World Bank, *Fertilizer Requirements of the Developing Countries*, Report No. 446, May 15, 1974. Although not available for the public, results of this report were presented to the Commission.

<sup>10</sup>FAO, "Review," AGS: F/74/2, p. 4-5.

<sup>11</sup>World Bank, *Fertilizer Requirements*, Report No. 446, pp. 14-15.

<sup>12</sup>ERS, *The World Fertilizer Situation: 1975, 1976 and 1980*, draft, June 1974, prepared for the U.S. delegation to the FAO Commission on Fertilizers, First Session, July 1974, published as WAS-5 Supplement in October 1974, based on TVA and U.S. agricultural attache data.

---

<sup>13</sup>Couston, J.W., *Recent Trends of the World Fertilizer Markets*, prepared for the Symposium on Interrelationships between Agricultural Input Industry and Agriculture (FAO: SYP/1/74), Tokyo, November 26-December 2, 1974, p. 9.

<sup>14</sup>FAO, "Review of Current Situation and Outlook," AGS:F/75/2, April 1975, Commission on Fertilizers, Second Session, Rome, 3-7 June 1975, Table 2, p. 21.

<sup>15</sup>The Fertilizer Institute, *TFI News*, August 1, 1975, p. 2; U.S. Dept. of Commerce *News*, November 19, 1975, Table 6.

<sup>16</sup>ERS, *World Agricultural Situation*, June 1975, p. 19.

<sup>17</sup>Statistical Reporting Service, USDA, "Commercial Fertilizers Consumption in the United States Year Ended June 30, 1975," November 3, 1975.



compared with a 6 percent rise in 1973/74. Phosphate consumption probably declined, particularly in France, Europe's biggest consumer, which saw a decline of perhaps 20 percent. In the developing countries it is reported that fertilizer consumption fell in such important countries as India, Indonesia, the Philippines, and Brazil, with one of the larger declines of about 27 percent occurring in India's phosphate use. Due to large stocks and foreign exchange problems India, Brazil, the Philippines, and Indonesia have all restricted or stopped their fertilizer imports for the time being.<sup>17</sup> Japan, the world's largest net exporter of nitrogen reportedly has over a million tons of complex fertilizers in stock, roughly three times its normal working inventories.

By mid-1975 world prices of many major fertilizer products had declined to one-half or one-third of their peak prices, but world demand for fertilizer remained weak. The developing countries particularly were caught in a dilemma of the political impossibility of raising food prices and the financial difficulty of providing large increases in

<sup>17</sup>British Sulphur Corporation, *Fertilizer International* Nos. 72-74, June, July and August 1975. Recent reports indicate India may ban fertilizer imports for the next 3 years.

fertilizer subsidies to overcome farmer resistance to high fertilizer prices.<sup>18</sup>

In this context, the Second Session of the Commission on Fertilizers was held in June 1975. The first major intervention (by India's delegate) at the meeting clearly states the problem. Largely on the basis of the 1974 Commission reports and projections, many developing countries had imported much fertilizer at prices so high their farmers would not or could not purchase it to produce the added food those countries need. That statement clearly pointed out the need to improve current information and projections on fertilizers, both to avoid such mistakes by buyers and to minimize the adverse impact of the investment cycle on fertilizer producers. The 1975 Commission produced both improved projections and a strong mandate to intensify efforts to improve world fertilizer data and investigate the possibilities of long term contracts to guarantee fertilizer supplies at reasonable prices to both buyers and sellers.

<sup>18</sup>Some countries like Indonesia and Iran provided subsidies ranging into the hundreds of millions of dollars. Brazil instituted a 40 percent subsidy retroactive to January 1975. But even such huge fertilizer subsidies do not guarantee increased food production if overall farming operations are not sufficiently profitable, and that depends heavily on crop prices.

## CURRENT SITUATION AND 1976/77 OUTLOOK

This study was prepared as preliminary reports on actual 1974/75 fertilizer consumption were becoming available. The 1974/75 estimates used here reflect trends and apparent consumption. They were developed by the FAO/UNIDO/World Bank Working Group on Fertilizers in April 1975, and thus do not fully reflect the widespread farmer resistance to high fertilizer prices which has occurred. Fertilizer consumption declined in such major countries as the United States, France, India, and Brazil in 1974/75. Overall, available data indicate world consumption of nitrogen remained roughly constant, but phosphate and potash consumption declined substantially. It is not clear whether future consumption will regain this lost growth and attain projected levels, particularly for 1975/76 and 1976/77. See Appendix B for preliminary 1974/75 consumption data on major countries.

### Nitrogen

Following a nearly 11 percent increase in 1973/74, world nitrogen consumption is estimated at 41.8 million tons in 1974/75, a rise of under 6 percent compared with an average annual increase of nearly 8 percent since 1968/69 (table I). Estimated consumption in developed countries rose less than 3 percent to 19.3 million tons, while that in developing countries climbed about 9 percent to 7.6 million tons. Consumption in both regions grew much less than the annual average rates of over 5 and 11 percent, respectively, for the previous 5 years. Estimated consumption in the centrally planned coun-

tries rose to 14.9 million tons, increasing by nearly 8 percent compared with annual average growth of almost 10 percent in the past 5 years.

Consumption estimates based on adjusted trends and apparent consumption generally neglect changes in inventories, which clearly grew substantially during 1975. Thus, while obviously based on preliminary data, the above estimates probably overstate the actual increase, if any, in fertilizer use by farmers.

Estimated world nitrogen supply grew in 1974/75 by over 7 percent to 42.1 million tons, somewhat above the estimated increase in consumption, with the largest rise occurring in the centrally planned

Table 1--Current world nitrogen fertilizer supply, consumption, and balance  
(Million metric tons of N)

Region	Reported 1973/74	1974/75	Estimated 1975/76	1976/77
<u>Developed Market Economies</u>				
Supply	22.7	22.7	22.9	24.1
Consumption	18.8	19.3	19.4	20.3
Balance	3.9	3.4	3.5	3.8
North America				
Supply <u>1/</u>	10.1	9.9	9.8	10.6
Consumption <u>2/</u>	9.6	9.8	9.6	10.1
Balance	0.5	0.1	0.2	0.5
West Europe				
Supply	10.0	9.9	10.2	10.6
Consumption	7.9	8.1	8.4	8.8
Balance	2.1	1.8	1.8	1.8
Oceania				
Supply	0.2	0.2	0.2	0.2
Consumption	0.2	0.2	0.2	0.2
Balance	--	--	--	--
Other Developed				
Supply	2.4	2.7	2.7	2.7
Consumption	1.1	1.2	1.2	1.2
Balance	1.3	1.5	1.5	1.5
<u>Developing Market Economies</u>				
Supply	4.0	4.3	5.2	6.5
Consumption	7.0	7.6	8.5	9.6
Balance	-3.0	-3.3	-3.3	-3.1
Africa				
Supply	0.2	0.2	0.2	0.2
Consumption	0.4	0.5	0.5	0.6
Balance	-0.2	-0.3	-0.3	-0.4
Latin America				
Supply	0.9	1.1	1.4	1.7
Consumption	1.8	2.0	2.2	2.4
Balance	-0.9	-0.9	-0.8	-0.7
Near East				
Supply	0.7	0.9	1.0	1.2
Consumption	1.2	1.1	1.3	1.4
Balance	-0.5	-0.2	-0.3	-0.2
Far East				
Supply	2.2	2.1	2.6	3.4
Consumption	3.6	4.0	4.5	5.2
Balance	-1.4	-1.9	-1.9	-1.8
<u>Centrally Planned Economies</u>				
Supply	14.3	15.1	16.0	17.3
Consumption	13.8	14.9	16.0	17.2
Balance	0.5	0.2	--	0.1
Asia				
Supply	3.0	3.4	3.6	4.1
Consumption	4.1	4.2	4.5	5.0
Balance	-1.1	-0.8	-0.9	-0.9
East Europe and USSR				
Supply	11.3	11.7	12.4	13.2
Consumption	9.7	10.7	11.5	12.2
Balance	1.6	1.0	0.9	1.0
<u>Total World</u>				
Supply	41.0	42.1	44.1	47.9
Available Supply <u>3/</u>	39.2	--	--	--
Consumption	39.6	41.8	43.9	47.1
Balance	-0.4	0.3	0.2	0.8

<sup>1/</sup> North American 1973/74 and 1974/75 supply is adjusted for producer inventory changes in the United States. Preliminary data may underestimate U.S. supply in 1974/75 by 150,000 to 250,000 tons of nitrogen.

<sup>2/</sup> Consumption in North America includes apparent consumption in the United States to accurately reflect the U.S. trade balance.

<sup>3/</sup> Available supply in 1973/74 excludes 1.8 million tons to account for ammonia production in North and Central America exported for further processing, materials in transit, and transport and handling losses. Estimated supply is comparable to reported available supply.

Note: See Appendix A for explanation of projection methodology.

Source: 1973/74 from FAO, Monthly Bulletin of Agricultural Economics and Statistics, April 1975 except North America includes USDA and U.S. Department of Commerce data for the United States. 1974/75 to 1976/77 from FAO, "Longer-Term Fertilizer Supply/Demand Position and Elements of a World Fertilizer Policy", AGS:F/75/7, May 1975, Commission on Fertilizers Second Session, Rome, June 3-7, 1975 showing estimates developed by the FAO/UNIDO/World Bank Working Group on Fertilizers, except North America 1974/75 data includes USDA and U.S. Department of Commerce data for the United States.



countries.<sup>19</sup> With the estimated increase in supply greater than growth in consumption, inventories have risen, as indicated by the improvement in the estimated world nitrogen balance.

The extent of inventory growth is exemplified by the United States, where June 1975 producer inventories of nitrogen were well above levels of the previous 2 years, and except for ammonia, approached or exceeded 1972 levels and were particularly high for urea which is very important in international trade (table 2). Urea inventories in Japan, the world's largest net exporter of nitrogen, increased by nearly 60 percent in 1974/75, while ammonium sulfate inventories nearly tripled. Several major developing countries including India, Indonesia, Brazil, and the Philippines have begun to restrict imports with the Indian embargo possibly continuing for 3 years.<sup>20</sup>

**Table 2—Ending June inventories of U.S. nitrogen fertilizer producers**  
(days of production equivalent)

Product	1972	1973	1974	1975
Ammonium nitrate . . . . .	23	5	5	20
Ammonium sulfate . . . . .	31	12	28	32
Anhydrous ammonia . . . . .	38	21	13	27
Urea . . . . .	22	13	18	41
Total Nitrogen Products . . . . .	34	15	13	27

Source: The Fertilizer Institute, *TFI News*, August 1975.

With the rapid growth of inventories in major exporting countries, the availability of fertilizer in world trade has improved greatly, particularly since 1975 began. Perhaps most symptomatic of the changes which have occurred in world markets has been the rapid decline of fertilizer prices in international tenders, with bagged urea prices, for example, falling from about \$380 per ton FOB in August 1974 to as low as \$95 per ton C&F in October 1975.<sup>21</sup>

In 1975/76, a 5-percent increase in world nitrogen consumption to 43.9 million tons is expected. With the estimated rise in supply to 44.1 million tons, the positive world balance of supply

over demand should continue. However, the positive balance depends on a 21-percent increase in developing country nitrogen production. In addition, the expected balance is not large, and a consumption increase equal to the past 5 years' average could again create moderate shortage conditions. Thus, continuation of the positive balance in 1975/76 depends heavily on continued relative softness of demand, which in turn depends heavily on the world grain situation and grain prices and how quickly the large fertilizer inventories can be reduced, particularly in the major importing countries.

Grain prices will probably remain below the highs of the last 2 years.<sup>22</sup> The United States had a bumper grain crop in 1975, with food and feed grain production up about 22 percent from the previous year. Grain crops in nearly all the developing countries and the People's Republic of China are expected to reach record highs. A record crop appears likely in India, following the excellent 1975 monsoon. Virtually all of the poor wheat and coarse grain crops are concentrated in the Soviet Union and Europe, which produce about half the world's wheat and over a third of the coarse grains. The massive Soviet grain imports have strengthened prices. However, after pushing upward after mid-1975 due to negotiations for the large Soviet purchases, grain prices resumed the downward trend which existed in late 1974 and early 1975. But drought may affect 1976 U.S. winter wheat.

In 1976/77, world nitrogen consumption is estimated to increase over 7 percent to 47.1 million tons, compared with a production increase of nearly 9 percent to 47.9 million tons, resulting in a significant improvement in the world balance. Again, much of the improvement depends on an additional 25-percent increase in supply from the developing countries based on a 31-percent rise in their capacity. The developed countries and the centrally planned countries are also expected to increase their supplies substantially, slightly increasing their surplus.

## Phosphate

In 1974/75, estimated world consumption of manufactured phosphate fertilizers rose less than 4 percent to 25.5 million tons of nutrient, after climbing over 7 percent in 1973/74 and averaging almost a 6-percent rise annually in the previous 5 years (table 3).<sup>23</sup> Estimated developed country con-

<sup>19</sup>The estimated supply in 1974/75 and later years excludes losses and reexports for further processing and is thus roughly comparable to available nitrogen supply from FAO data in 1973/74.

<sup>20</sup>British Sulphur Corporation, *Fertilizer International*, No. 76, October 1975 and No. 79, January 1976.

<sup>21</sup>These two prices are, of course, not strictly comparable since the latter includes shipping costs which are probably quite low in this case. Shipping rates have declined dramatically since 1974, and seem likely to remain at fairly low levels for some time. See British Sulphur Corporation, *Nitrogen*, Number 95, May/June, p. 18-19.

<sup>22</sup>ERS, *World Agricultural Situation*, WAS-8, October 1975, pp. 25-35, and WAS-9, December 1975, pp. 31-41.

<sup>23</sup>As with nitrogen, phosphate consumption growth is probably overestimated due in part to unmeasured inventory growth. More recent preliminary estimates indicate

Table 3--Current world phosphate fertilizer supply, consumption, and balance  
(Million metric tons of P<sub>2</sub>O<sub>5</sub>)

Region	Reported 1973/74	1974/75	Estimated 1975/76	1976/77
<u>Developed Market Economies</u>				
Supply	16.2	16.6	17.1	18.1
Consumption	14.3	14.4	14.6	15.1
Balance	1.9	2.2	2.5	3.0
North America				
Supply 1/	6.8	7.1	7.3	7.8
Consumption 2/	5.5	5.4	5.4	5.7
Balance	1.3	1.7	1.9	2.1
West Europe				
Supply	6.7	6.6	7.0	7.3
Consumption	6.1	6.2	6.4	6.6
Balance	0.6	0.4	0.6	0.7
Oceania				
Supply	1.6	1.6	1.5	1.6
Consumption	1.6	1.6	1.6	1.6
Balance	--	--	-0.1	--
Other Developed				
Supply	1.1	1.3	1.3	1.4
Consumption	1.1	1.2	1.2	1.2
Balance	--	0.1	0.1	0.2
<u>Developing Market Economies</u>				
Supply	2.2	2.8	3.4	4.1
Consumption	3.4	3.8	4.2	4.3
Balance	-1.2	-1.0	-0.6	-0.3
Africa				
Supply	0.5	0.8	1.1	1.4
Consumption	0.3	0.3	0.4	0.4
Balance	0.2	0.5	0.7	1.0
Latin America				
Supply	0.8	0.9	0.9	1.1
Consumption	1.4	1.5	1.6	1.7
Balance	-0.6	-0.6	-0.7	-0.7
Near East				
Supply	0.3	0.5	0.6	0.8
Consumption	0.5	0.6	0.7	0.7
Balance	-0.2	-0.1	-0.1	0.1
Far East				
Supply	0.6	0.6	0.8	0.8
Consumption	1.2	1.4	1.5	1.6
Balance	-0.6	-0.8	-0.7	-0.7
<u>Centrally Planned Economies</u>				
Supply	7.0	8.4	8.7	8.9
Consumption	6.9	7.3	7.2	8.3
Balance	0.1	1.1	0.8	0.6
Asia				
Supply	1.5	1.5	1.5	1.6
Consumption	1.6	1.6	1.8	1.9
Balance	-0.1	-0.1	-0.3	-0.3
East Europe and USSR				
Supply	5.5	6.9	7.2	7.3
Consumption	5.3	5.7	6.1	6.4
Balance	0.2	1.2	1.1	0.9
<u>Total World</u>				
Supply	25.4	27.8	29.2	31.0
Available Supply 3/	24.6	--	--	--
Consumption	24.6	25.5	26.5	27.7
Balance	0.0	2.3	2.9	3.3

1/ North American 1973/74 and 1974/75 supply is adjusted for producer inventory changes in the United States.

2/ Consumption in North America includes apparent consumption in the United States to accurately reflect the U.S. trade balance.

3/ Available supply in 1973/74 excludes 808,000 tons to account for technical phosphate production in several countries and transport and handling losses. Estimated supply is comparable to reported available supply.

Note: See Appendix A for explanation of projection methodology.

Source: 1973/74 from FAO, *Monthly Bulletin of Agricultural Economics and Statistics*, April 1975 except North America includes USDA and U.S. Department of Commerce data for the United States. 1974/75 to 1976/77 from FAO, "Longer-Term Fertilizer Supply/Demand Position and Elements of a World Fertilizer Policy", AGS/F/75/7, May 1975, Commission on Fertilizers Second Session, Rome, June 3-7, 1975 showing estimates developed by the FAO/UNIDO/World Bank Working Group on Fertilizers, except North America 1974/75 data includes USDA and U.S. Department of Commerce data for the United States; centrally planned Asia includes supply data from World Bank, *Fertilizer Requirements of the Developing Countries-Revised Outlook in 1975*, Report No. 830, July 1975, Annex 2.

sumption remained essentially constant at 14.4 million tons, compared to an increase of over 4 percent in 1973/74 and increases averaging more than 3 percent annually over the past 5 years. Developing country consumption rose nearly 12 percent to 3.8 million tons, slightly less than the nearly 13-percent increase in the previous year and equaling the last 5 years' average. The centrally planned countries raised consumption to an estimated 7.3 million tons, an increase of less than 6 percent compared with almost 12 percent last year and over 9 percent average during the past five years.

World phosphate supply in 1974/75 rose nearly 13 percent to an estimated 27.8 million tons, substantially more than the estimated increase in consumption. Estimated production grew the most in relative terms in the developing countries, with an increase of more than one-fourth. The world supply-consumption balance has thus improved substantially in the last year, resulting in rapid growth of inventories. In the United States, by far the world's largest exporter of phosphate fertilizers, inventories of major products are well above 1972 levels (table 4). Estimated additions to phosphate stocks in India in 1974/75 may have totaled over one-fourth of consumption. Reflecting the generally high inventory position of both exporters and importers, bid prices against international tenders for triple superphosphate fell from \$325 per ton bulk FOB vessel in August 1974 to roughly \$125 per ton bagged FOB vessel in October 1975.<sup>24</sup> Diammonium phosphate in bags FOB vessel has dropped from nearly \$400 per ton in August 1974 to perhaps \$160 per ton in October 1975.

In 1975/76, a rise in phosphate consumption of nearly 4 percent to 26.5 million tons is expected. With a 5-percent supply increase to an estimated

29.2 million tons, the world balance should again improve significantly by about one-quarter. The estimated positive balance totals over 10 percent of expected consumption and could easily absorb a relative consumption increase equaling the average growth rate of the last 5 years, or the higher growth of 1973/74. With 1976/77 consumption and supply expected to reach 27.7 and 31.0 million tons, the large positive balance should continue. Thus, adequate phosphate supplies for farmers seem likely to continue regardless of any probable increase in demand. These expectations are, however, dependent on substantial supply increases, particularly from North America and the developing countries, which will have increased capacity by 35 and 85 percent, respectively, between 1973/74 and 1975/76, as well as significant production growth in centrally planned countries and in Western Europe.

West European and to some extent East European producers are currently caught in a squeeze between high prices for Moroccan phosphate rock (reportedly now being reduced) and low world prices for phosphate fertilizer products. They are at a competitive disadvantage with U.S. producers, many of whom are vertically integrated and have their own mines. The recent formation in the United States of Phoschem, a phosphate producers' export association under the Webb-Pomerene Act, may worsen the European producers' position. Under these conditions, they may cancel plans to expand production for export.<sup>25</sup>

## Potash

After climbing nearly 10 percent in 1973/74, estimated world potash consumption rose less than 3 percent in 1974/75 to 22.0 million tons compared with a 7-percent average rise over the last 5 years (table 5).<sup>26</sup> Developed country potash consumption is estimated at 12.0 million tons, a slight decrease compared with a rise of almost 8 percent in 1973/74 and nearly 5 percent in the previous 5 years. Estimated consumption in the developing countries climbed to 2.3 million tons, an increase of 15 percent, while the centrally planned countries' estimated consumption rose nearly 7 percent to 7.8 million tons.

**Table 4—Ending June inventories of U.S. phosphate fertilizer producers**  
(days of production equivalent)

Product	1972	1973	1974	1975
Diammonium phosphate . . .	37	18	18	44
Triple superphosphate . . . .	29	21	23	53
Wet process phosphoric acid . . . . .	7	5	6	8
Total phosphate products <sup>1</sup> . . . . .	24	15	15	33

<sup>1</sup> Exclude phosphate rock.

an increase of only 2 percent in world phosphate demand; outside the centrally planned regions consumption may have dropped 4 percent, due particularly to a sharp decline in Western Europe. See British Sulphur Corporation, *Phosphorus and Potassium*, No. 79, September/October 1975.

<sup>24</sup>Prices for bagged fertilizers are generally about \$25 to \$30 per ton higher than for bulk.

<sup>25</sup>Phoschem currently includes eight producers who account for about 75 percent of the U.S. phosphate fertilizer exports. It follows several similar associations, particularly Phosrock for U.S. phosphate rock producers, NITREX for European nitrogen producers, and Canpotex for Canadian potash exporters. All basically determine export prices.

<sup>26</sup>Consumption is very likely overestimated due in part to unmeasured inventory changes. More recent data indicate actual growth in effective demand may have been less than 1 percent. See British Sulphur Corporation



Table 5--Current world potash fertilizer supply, consumption, and balance  
(Million metric tons of K<sub>2</sub>O)

Region	Reported 1973/74	Estimated		
		1974/75	1975/76	1976/77
<u>Developed Market Economies</u>				
Supply	13.1	14.0	14.5	15.3
Consumption	12.1	12.0	12.3	12.7
Balance	1.0	2.0	2.2	2.5
North America				
Supply <u>1/</u>	7.4	8.0	8.0	8.4
Consumption <u>2/</u>	5.5	5.1	5.3	5.5
Balance	1.9	2.9	2.7	2.9
West Europe				
Supply	5.2	5.4	5.8	6.1
Consumption	5.5	5.7	5.8	6.0
Balance	-0.3	-0.3	--	0.1
Oceania				
Supply	--	--	--	--
Consumption	0.3	0.3	0.3	0.3
Balance	-0.3	-0.3	-0.3	-0.3
Other Developed				
Supply	0.5	0.6	0.7	0.7
Consumption	0.8	0.9	0.9	0.9
Balance	-0.3	-0.3	-0.2	-0.2
<u>Developing Market Economies</u>				
Supply	0.3	0.3	0.3	0.3
Consumption	2.0	2.3	2.5	2.9
Balance	-1.7	-2.0	-2.2	-2.5
Africa				
Supply	0.3	0.3	0.3	0.3
Consumption	0.2	0.2	0.2	0.3
Balance	0.1	0.1	0.1	--
Latin America				
Supply	--	--	--	--
Consumption	0.9	1.1	1.2	1.3
Balance	-0.9	-1.1	-1.2	-1.3
Near East				
Supply	--	--	--	--
Consumption	0.1	0.1	0.1	0.1
Balance	-0.1	-0.1	-0.1	-0.1
Far East				
Supply	--	--	--	--
Consumption	0.8	0.1	1.0	1.2
Balance	-0.8	-0.1	-1.0	-1.2
<u>Centrally Planned Economies</u>				
Supply	8.7	9.5	10.5	11.3
Consumption	7.3	7.8	8.2	8.7
Balance	1.4	1.7	2.3	2.6
Asia				
Supply	0.2	0.2	0.2	0.2
Consumption	0.6	0.7	0.7	0.7
Balance	-0.4	-0.5	-0.5	-0.5
East Europe and USSR				
Supply	8.5	9.3	10.3	11.1
Consumption	6.7	7.1	7.5	8.0
Balance	1.8	2.2	2.8	3.1
<u>Total World</u>				
Supply	22.1	23.8	25.3	26.8
Available Supply <u>3/</u>	20.9	22.6	23.9	25.3
Consumption	21.4	22.0	23.0	24.2
Balance	-0.5	0.6	0.9	1.1

<sup>1/</sup> North American 1973/74 and 1974/75 supply is adjusted for producer inventory changes in the United States.

<sup>2/</sup> Consumption in North America includes apparent consumption in the United States to accurately reflect the U.S. trade balance.

<sup>3/</sup> Available supply is 95% of the world supply to account for non-fertilizer use and losses.

Note: See Appendix A for explanation of projection methodology.

Source: 1973/74 from FAO, *Monthly Bulletin of Agricultural Economics and Statistics*, April 1975 except North America includes USDA and U.S. Department of Commerce data for the United States. 1974/75 to 1976/77 from FAO, "Longer-Term Fertilizer Supply/Demand Position and Elements of a World Fertilizer Policy", AGS/E/75/7, May 1975, Commission on Fertilizers Second Session, Rome, June 3-7, 1975 showing estimates developed by the FAO/UNIDO/World Bank Working Group on Fertilizers, except North America 1974/75 data includes USDA and U.S. Department of Commerce data for the United States.



World available potash supply rose nearly 6 percent to an estimated 22.6 million tons. With increased supply estimated well above consumption, the world potash balance improved considerably. Inventories have grown rapidly. In the United States, easily the world's largest potash consumer, ending June producer inventories of potash were at 79 days of production equivalent compared with 35 days in 1972, 20 days in 1973, and 22 days in 1974.<sup>27</sup> In Canada, the world's largest potash producer and exporter, inventories moved from about 14 days normal production equivalent in December 1974 to 42 days in July 1975.<sup>28</sup> World potash prices, which are largely controlled by Canadian producers and the Saskatchewan government, increased relatively much less than nitrogen and phosphate prices and now remain fairly firm in the face of growing inventories. Potassium chloride prices in November 1975 were roughly \$70 to \$80 per ton bulk FOB Vancouver, after peaking at roughly \$90 per ton in early 1975.<sup>29</sup>

In 1975/76 world potash consumption is expected to rise about 5 percent to 23.0 million

tons, while available world supply should increase almost 6 percent to 23.9 million tons. The world potash balance is expected to improve and should be sufficient to absorb a relative consumption increase equaling the last 5 years' average growth rate. Consumption growth at the 1973/74 rate would, however, slightly exceed available supplies. Thus, stable market conditions for potash seem likely to continue in 1975/76 barring an unexpectedly large increase in demand.

Increased potash supplies are expected primarily from North America, the USSR, and Western Europe, and are particularly dependent on continued renovation of existing Canadian capacity. In November 1975, the Saskatchewan government announced plans to nationalize part or all of the potash industry over an 18-month period starting in 1976. The impact on production of the provincial decision is not yet clear. However, it could well eliminate further outside investment in Canadian potash mines, interrupting renovation activities and leaving near-term future improvement and expansion dependent on provincial decisions and resources.

In 1976/77, world potash consumption is expected to reach 24.2 million tons, an increase of over 5 percent. Estimated available supply, assuming no interruption in Canadian potash supply growth, will increase nearly 6 percent to 25.3 million tons, resulting in a slight improvement of the world balance. Increased supplies are again expected from North America, Western Europe, and the USSR.

---

Phosphorus and Potassium, No. 79, September/October 1975.

<sup>27</sup>The Fertilizer Institute, *TFI News*, August 1, 1975.

<sup>28</sup>British Sulphur Corporation, *Phosphorus and Potassium*, No. 79, September/October, 1975.

<sup>29</sup>British Sulphur Corporation, *Fertilizer International*, No. 78 December 1975.

## WORLD FERTILIZER PROSPECTS TO 1980/81

### Nitrogen

Projected world nitrogen consumption will reach 60.6 million tons by 1980/81 (table 6). The implied annual growth rate between 1973/74 and 1980/81 is over 6 percent, somewhat below the previous 5 years' rate of nearly 8 percent. In this period, the developing countries will increase their share of world nitrogen consumption from 18 percent to 23 percent, while the share of the centrally planned countries will increase slightly to 36 percent and the developed countries' share will fall to 40 percent. Annual consumption growth will average over 10 percent in the developing countries, nearly 7 percent in the centrally planned countries, and less than 4 percent in the developed countries, all slightly below their 1968/69 to 1973/74 growth rate.

Based on new plants under construction, contracted, and planned, estimated world nitrogen pro-

duction in 1980/81 will reach 62.3 million tons. The implied annual growth rate of nearly 7 percent is above the expected consumption growth, and close to the 1968/69 to 1973/74 growth rate. The developing countries will significantly increase their share of world production to nearly 20 percent, compared with about 10 percent in 1973/74. The developed countries' share will fall substantially from over 55 percent to 45 percent, while the centrally planned countries' share will remain at roughly 30 percent. The growth rate in the developing countries' estimated production of roughly 18 percent is well above the recent past rates. It is also above developing country consumption growth, which will significantly reduce their production deficit and imports if announced contracts and plans for new capacity are fulfilled. Developed countries' and particularly centrally planned countries' growth rates for estimated production are well below their 1968/69 to 1973/74 growth rates. Due

Table 6--Estimated nitrogen fertilizer production, consumption, and balance in 1980/81

Region	1980/81 Million Metric Tons	Growth Rates-Percent		Share of Total-Percent		
		1968/69- 1973/74	1973/74 - 1980/81	1968/69	1973/74	1980/81
<u>Developed Market Economies</u>						
Production	28.1	4.4	3.1	64.4	55.8	45.1
Consumption	24.3	6.4	3.7	51.9	48.5	40.1
Balance	3.8	--	--	--	--	--
North America						
Production	13.1	5.2	4.1	27.1	24.3	21.0
Consumption	12.2	5.9	4.8	24.8	22.7	20.1
Balance	0.9	--	--	--	--	--
West Europe						
Production	12.1	3.8	2.8	29.2	24.6	19.4
Consumption	10.4	5.7	4.0	22.6	20.4	17.2
Balance	1.7	--	--	--	--	--
Oceania						
Production	0.3	14.9	6.0	--	--	--
Consumption	0.3	--	6.0	0.8	0.5	--
Balance	--	--	--	--	--	--
Other Developed						
Production	2.6	0.9	1.2	8.1	5.9	4.2
Consumption	1.4	--	3.5	4.1	2.8	2.3
Balance	1.2	--	--	--	--	--
<u>Developing Market Economies</u>						
Production	12.2	14.9	17.0	7.0	9.8	19.6
Consumption	14.1	10.8	10.5	15.8	18.0	23.3
Balance	-1.9	--	--	--	--	--
Africa						
Production	0.6	38.0	17.0	--	--	0.9
Consumption	0.9	14.9	12.3	0.8	1.0	1.5
Balance	-0.3	--	--	--	--	--
Latin America						
Production	2.3	8.5	14.3	2.1	2.2	3.7
Consumption	3.2	10.4	8.6	4.1	4.6	5.3
Balance	-0.9	--	--	--	--	--
Near East						
Production	2.6	18.5	20.6	1.1	1.7	4.2
Consumption	2.2	14.9	9.0	2.3	3.1	3.6
Balance	0.4	--	--	--	--	--
Far East						
Production	6.7	14.9	17.2	3.9	5.4	10.8
Consumption	7.8	10.4	11.7	8.3	9.3	12.9
Balance	-1.1	--	--	--	--	--
<u>Centrally Planned Economies</u>						
Production	22.0	12.0	6.3	28.5	35.1	35.3
Consumption	22.2	9.9	7.0	32.3	35.6	36.6
Balance	0.2	--	--	--	--	--
Asia						
Production	6.5	18.2	11.7	4.6	7.4	10.4
Consumption	7.1	9.5	8.2	9.8	10.6	11.7
Balance	-0.6	--	--	--	--	--
East Europe-USSR						
Production	15.5	10.7	4.6	23.9	27.8	24.9
Consumption	15.1	9.7	6.9	22.9	25.0	24.9
Balance	0.4	--	--	--	--	--
<u>Total World</u>						
Production	62.3	7.5	6.3	--	--	--
Consumption	60.6	7.8	6.6	--	--	--
Balance	1.7	--	--	--	--	--

Source: 1980/81 from FAO, "Longer-Term Fertilizer Supply/Demand Position and Elements of a World Fertilizer Policy," AGS:F/75/7, May 1975, Commission on Fertilizers Second Session, Rome, June 3-7, 1975.

in large part to relatively rapid production growth expected in the developing countries, the balance of world production over consumption should grow from near equality at present to 1.7 million tons in 1980/81, which is about 3 percent of consumption and should be sufficient for stable markets particularly with the low final average capacity utilization rate (70 percent) assumed in the estimates.

Between 1973/74 and 1980/81, the excess of supply capability over consumption is expected to peak at 2.1 million tons in 1978/79 (figure 2). Most of the expected excess will be due to large surplus supplies available for export from North America, Western Europe, and Japan; a change from import to export balance in the Near East; and a substantial decline in import requirements in the Far East and the People's Republic of China (PRC). North America in particular is projected to turn from a small to a large net exporter, although rumored cancellations of several U.S. plants could reduce net export capability, which would perhaps more accurately reflect the U.S. energy situation.

Projected world capacity will increase to 107.2 million tons of nitrogen by 1980/81, an increase between 1973/74 and 1980/81 of 44.7 million tons averaging 8 percent annually (table 7). The largest projected increases in world capacity will occur in 1976/77 and 1977/78, with a 13-percent rise expected in 1976/77. Between 1973/74 and 1980/81, the share of world capacity in the developed countries is expected to drop from 55 percent to 43 percent, rise in the developing countries from 12 percent to 24 percent, and remain constant in the centrally planned countries.

Of the new capacity projected by 1980/81, over 40 percent will go into the developing countries, while 32 percent will go into the centrally planned

## ESTIMATED WORLD FERTILIZER SUPPLY AND CONSUMPTION

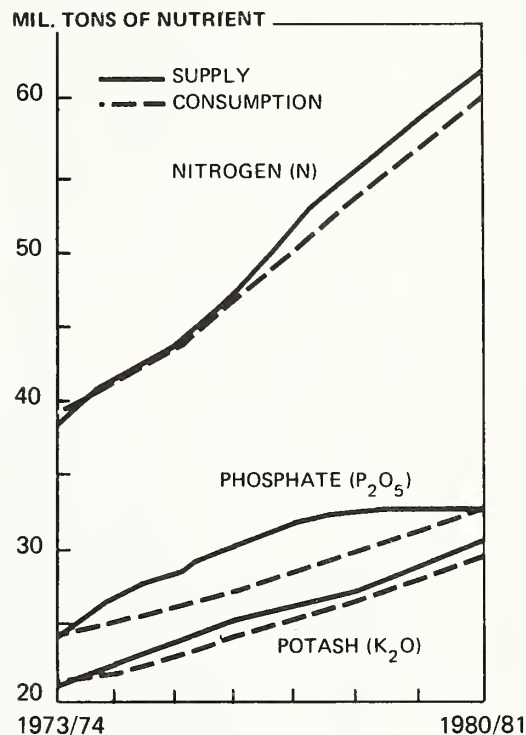


Figure 2

Table 7—Expected world nitrogen capacity growth  
(million metric tons of N)

Region	1973/74	1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81
Developed Market Economies .....	34.2	35.0	36.5	40.0	43.5	44.4	45.9	46.4
North America .....	14.2	14.8	16.0	18.6	21.1	21.1	21.5	21.5
West Europe .....	15.3	15.3	15.5	16.4	17.4	18.3	19.1	19.6
Oceania .....	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Other developed .....	4.4	4.6	4.7	4.7	4.7	4.7	5.0	5.0
Developing Market Economies .....	7.4	8.3	9.6	12.6	16.8	21.3	24.3	25.4
Africa .....	0.4	0.4	0.4	0.4	0.7	1.0	1.0	1.0
Latin America .....	1.8	2.4	2.7	3.3	4.3	4.6	5.5	5.6
Near East .....	1.5	1.7	1.8	2.3	3.3	4.5	4.8	5.6
Far East .....	3.7	3.9	4.7	6.7	8.5	11.2	13.0	13.2
Centrally Planned Economies .....	20.9	22.2	24.4	27.1	28.5	30.6	34.7	35.4
Asia .....	4.8	4.9	5.0	6.5	7.7	8.7	9.7	9.9
USSR-East Europe .....	16.1	17.3	19.4	20.6	20.8	21.9	25.0	25.5
World Total .....	62.5	65.6	70.6	79.7	88.8	96.3	104.8	107.2

Source: FAO, "Longer-Term Fertilizer Supply/Demand position and Elements of a World Fertilizer Policy," AGS:F/75/7, May 1975, FAO Commission on Fertilizers, June 3-7, 1975.



countries and 27 percent into the developed countries. In the developing countries, the Far East will account for over half the total expected capacity increase. Most of the increase in the Far East is expected from India, South Korea, Indonesia, and Pakistan. India alone may add close to 6.0 million tons of nitrogen, nearly two-thirds of the Far East total increase. Thus, the improved situation for 1980/81 depends heavily on the performance of the developing countries in bringing new capacity on stream as scheduled and operating it efficiently.

Projected capacity in 1979/80 totals 104.8 million tons, compared with earlier estimates of 76.6 million tons as of late 1973, 89.0 million tons as of April 1974, and 97.1 million tons in July 1974.<sup>30</sup> Much of the world's expected new nitrogen capacity was announced before July 1974, particularly in the first half of 1974.

More recent data indicate some cancellations of previously announced plants and expansions, perhaps as many as five in North America, at least three in the Far East, and several in the Near East. At this time, however, the extent of cancellations is not yet certain. Such cancellations could eliminate the positive 1980/81 balance and reduce or eliminate the surplus expected in the late 1970's. However, announcements for new plants elsewhere are still occurring, as indicated by the recent contracts for one large new nitrogen plant in Poland and two in Abu Dhabi. In addition, an October 1975 report by a Japanese international consulting firm indicates a much larger world supply and surplus by 1980/81. And recent reports indicate the 13 large ammonia-urea plants being imported by the Peoples Republic of China may be completed ahead of schedule, with the first expected on stream in March 1976 and perhaps as many as six to be completed before the end of 1976. Early completion of these plants will reduce Chinese dependence on imports more rapidly than expected, free nitrogen export supplies (particularly from Japan) for other markets, and to some extent counteract in the near term the impact of plant cancellations which might occur.

Late 1975 TVA data indicate that expected 1979/80 world nitrogen capacity may be a million tons less than the earlier capacity estimates above. In addition, the FAO/UNIDO/World Bank Working Group in October 1975 reduced its estimates of capacity growth to 1979/80 by nearly 20 percent. Thus, on balance, some excess nitrogen capacity is still likely in the next few years, but that situation may not be as severe or long lasting as the above projections indicate.

Estimates of 1980/81 nitrogen consumption from various major sources tend to cluster around 60 million tons.<sup>31</sup> The need to raise fertilizer consumption above projected levels, however, is clear, particularly in the developing countries if they are to approach food self-sufficiency. With policies to encourage fertilizer use and the likelihood of stable, reasonable prices, fertilizer consumption could rise during the late 1970's more rapidly than projected. Consumption growth equivalent to the growth rates from 1968/69 to 1973/74 could result in a significant deficit in the 1980/81 world nitrogen balance.

## Phosphate

Estimated world phosphate consumption will reach 33.1 million tons by 1980/81. The growth rate from 1973/74 to 1980/81 implied by these projections is over 4 percent annually, down from about 6 percent between 1968/69 and 1973/74 (table 8). The developing countries are expected to increase their share of world consumption from less than 14 percent to almost 18 percent, while the centrally planned countries will raise their share somewhat to nearly 31 percent and the developed countries' share will fall to about 52 percent. The developing countries' annual consumption growth is expected to average just over 8 percent, with the centrally planned countries averaging about 6 percent and the developed countries less than 3 percent growth annually. These implied growth rates are significantly below the 1968/69 to 1973/74 average growth rates.

By 1980/81, world phosphate production is expected to reach 33.3 million tons. The implied growth rate of just over 4 percent is well below the 1968/69 to 1973/74 rate. The developing countries will increase their share of the world's total phosphate production to nearly 18 percent, up from only 9 percent in 1973/74, while the centrally planned countries' share will decline slightly to 25 percent and the developed countries' share will fall from about 66 percent to 57 percent. The expected growth rate in developing countries' estimated production of over 13 percent is slightly above the 1968/69 to 1973/74 average. It is also well above the developing countries' estimated consumption growth rate, which will essentially eliminate their phosphate production deficit and import requirements if announced contracted and planned new capacity is completed on schedule and if consumption grows as projected. Implied growth rates for the developed countries, and particularly for the

<sup>30</sup>ERS, *World Fertilizer Situation: 1975, 1976 and 1980*, WAS-5 Supplement, October 1974, pp. 16 and 19, based on TVA capacity data.

<sup>31</sup>See World Bank, *Fertilizer Requirements of the Developing Countries—Revised Outlook in 1975*, Report No. 830, July 1975.



Table 8--Estimated phosphate fertilizer production, consumption, and balance in 1980/81

Region	1980/81 Million Metric Tons	Growth Rates-Percent		Share of Total-Percent		
		1968/69- 1973/74	1973/74- 1980/81	1968/69	1973/74	1980/81
<u>Developed Market Economies</u>						
Production	19.0	4.2	2.3	72.5	65.9	57.1
Consumption	17.1	3.9	2.6	64.8	58.1	51.7
Balance	1.9	--	--	--	--	--
<u>North America</u>						
Production	8.5	5.9	3.2	28.0	27.6	25.5
Consumption	6.8	4.1	3.1	24.7	22.4	20.5
Balance	1.7	--	--	--	--	--
<u>West Europe</u>						
Production	7.3	2.6	1.2	32.4	27.2	21.9
Consumption	7.1	3.7	2.2	28.0	24.8	21.4
Balance	0.2	--	--	--	--	--
<u>Oceania</u>						
Production	1.6	5.9	--	6.6	6.5	4.8
Consumption	1.8	5.9	1.7	6.6	6.5	5.4
Balance	-0.2	--	--	--	--	--
<u>Other Developed</u>						
Production	1.6	--	5.5	6.0	4.4	4.8
Consumption	1.4	1.9	3.5	5.6	4.4	4.2
Balance	0.2	--	--	--	--	--
<u>Developing Market Economies</u>						
Production	5.9	12.9	15.1	6.6	8.9	17.7
Consumption	5.9	11.2	8.2	11.0	13.8	17.8
Balance	--	--	--	--	--	--
<u>Africa</u>						
Production	2.2	4.6	23.6	2.2	2.0	6.6
Consumption	0.5	8.5	7.6	1.1	1.2	1.5
Balance	1.7	--	--	--	--	--
<u>Latin America</u>						
Production	1.6	21.6	10.4	1.6	3.3	4.8
Consumption	2.2	11.8	6.7	4.4	5.7	6.6
Balance	-0.6	--	--	--	--	--
<u>Near East</u>						
Production	0.9	24.6	17.0	0.5	1.2	2.7
Consumption	0.9	20.1	8.6	1.1	2.0	2.7
Balance	--	--	--	--	--	--
<u>Far East</u>						
Production	1.1	8.5	6.0	2.2	2.4	3.3
Consumption	2.2	19.1	9.0	2.7	4.9	6.6
Balance	-1.1	--	--	--	--	--
<u>Centrally Planned Economies</u>						
Production	8.4	10.8	2.6	23.1	28.4	25.2
Consumption	10.1	9.4	5.6	24.2	28.0	30.5
Balance	-1.7	--	--	--	--	--
<u>Asia</u>						
Production	1.6	16.5	0.9	3.8	6.1	4.2
Consumption	2.3	18.0	5.3	3.8	6.5	6.9
Balance	-0.9	--	--	--	--	--
<u>East Europe-USSR</u>						
Production	7.0	9.5	3.5	19.2	22.4	21.0
Consumption	7.8	7.5	5.7	20.3	21.5	23.6
Balance	-0.8	--	--	--	--	--
<u>Total World</u>						
Production	33.3	5.8	4.4	--	--	--
Consumption	33.1	6.2	4.3	--	--	--
Balance	0.2	--	--	--	--	--

Source: 1980/81 from FAO, "Longer-Term Fertilizer Supply/Demand Position and Elements of a World Fertilizer Policy," AGS/F/75/7, May 1975, Commission on Fertilizers Second Session, Rome, June 3-7, 1975.

centrally planned countries, are well below their 1968/69 to 1973/74 rates. The largest phosphate production increases will be concentrated in North America, Africa, and the Eastern Europe-USSR regions. Estimated world production and consumption will be roughly in balance by 1980/81, indicating the likely need for more plant investment in the late 1970's. The excess of expected supply capability over estimated consumption will peak in about 1977/78, with particularly rapid supply increases expected between now and 1977/78 (figure 2).

Estimated world phosphoric acid capacity will rise to 32.4 million tons of  $P_2O_5$  in 1980/81, representing an increase of 11.6 million tons from 1973/74 to 1980/81 (table 9).<sup>32</sup> Capacity rose substantially in 1974/75, and strong increases are expected in 1975/76 and 1976/77. By 1980/81, the share of world capacity in the developed countries is expected to fall from 64 percent to 58 percent and in the centrally planned countries from nearly 23 percent to 19 percent, while the developing countries' share will rise from 13 percent to over 23 percent. North America will maintain its share of world capacity at about one-third. The developing countries will account for over 40 percent of the expected new phosphoric acid, while less than 45 percent will go into the developed countries and only about 13 percent into the centrally planned countries. Over 70 percent of the developing countries' new capacity will be concentrated in Africa and Latin America, mainly in Morocco and Brazil,

while over 60 percent of the developed countries' new capacity is expected in North America, particularly in the United States. Thus, the expected improvement in the phosphate situation depends heavily on the expected new capacity in the developing countries, as well as on the established U.S. industry, and on efficient operation of the developing countries' new capacity.

Comparison to previous capacity estimates indicates that relatively little new capacity has been announced since late 1973. Late 1975 TVA estimates of phosphoric acid capacity in 1979/80 were essentially the same as the earlier estimates shown above. In October 1975, the FAO/UNIDO/World Bank Working Group revised capacity growth estimates downward by about 9 percent. However, the world phosphate capacity increase in the phosphate industry is about a year ahead of the nitrogen sector. A significant impact from phosphate plant cancellations due to current low prices therefore seems unlikely because much of the new capacity is already near completion or under construction.

Estimates from other sources of 1980/81 phosphate consumption approximate 33 million tons, with some estimates well above that level. Consumption growth at a rate equal to the 1968/69 to 1973/74 period would result in a large deficit in the 1980/81 world phosphate balance. Expected supply capability would, however, be sufficient to maintain a significant positive balance to 1978/79 if the 1968/69 to 1973/74 growth rate held.

## Potash

World potash consumption is expected to reach 29.5 million tons by 1980/81. The implied growth

<sup>32</sup>While not representing all the existing phosphate fertilizer capacity, new phosphoric acid capacity accounts for most of the additional world phosphate capacity expected.

Table 9—Expected world phosphoric acid capacity growth  
(million metric tons)

Region	1973/74	1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81
Developed Market Economies .....	13.3	15.8	17.3	17.8	18.4	18.6	18.8	18.8
North America .....	6.9	8.7	9.3	9.3	9.9	10.1	10.2	10.2
West Europe .....	5.0	5.4	6.4	6.4	6.4	6.4	6.4	6.4
Oceania .....	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Other Developed .....	1.2	1.4	1.4	1.9	1.9	1.9	1.9	1.9
Developing Market Economies .....	2.7	3.5	5.0	6.4	7.0	7.2	7.5	7.5
Africa .....	0.7	1.0	2.0	2.4	2.9	2.9	2.9	2.9
Latin America .....	0.8	0.9	1.3	1.7	1.7	1.7	2.0	2.0
Near East .....	0.5	0.7	0.7	1.1	1.1	1.1	1.1	1.1
Far East .....	0.7	1.0	1.1	1.2	1.3	1.5	1.5	1.5
Centrally Planned Economies .....	4.7	5.9	6.0	6.2	6.2	6.2	6.2	6.2
Asia .....	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2
USSR-East Europe .....	4.6	5.8	5.9	6.0	6.0	6.0	6.0	6.0
World Total .....	20.8	25.4	28.3	30.4	31.6	32.0	32.4	32.4

Source: FAO, "Longer-Term Fertilizer Supply/Demand Position and Elements of a World Fertilizer Policy," AGS:F/75/7, May 1975, FAO Commission on Fertilizers, June 3-7, 1975.

rate from 1973/74 to 1980/81 is less than 5 percent annually, down from 7 percent from 1968/69 to 1973/74 (table 10). The developing countries are expected to increase their share of world potash consumption from less than 10 percent to almost 14 percent, while the centrally planned countries' share will rise slightly to over 35 percent, and the developed countries' share will fall from 59 to less than 54 percent. Expected annual consumption growth rates will average over 10 percent for the developing countries, 5 percent for the centrally planned countries, and 3 percent for the developed countries, all somewhat lower than their 1968/69 to 1973/74 growth rates.

Estimated world potash production based on facilities under construction, contracted, or planned, will reach 32.1 million tons by 1980/81. The implied production growth rate exceeds the expected consumption growth rate, but falls short of the 1968/69 to 1973/74 rate. The centrally planned countries will increase their share of world production from 39 percent in 1973/74 to an expected 45 percent in 1980/81, while the developed countries' share will fall from 59 percent to 54 percent. North America's share in particular will fall while the Eastern Europe-USSR share rises. The developing countries will produce less than 2 percent of the world's total potash, and their import requirements will roughly double by 1980/81, in direct contrast to the projected decline in their nitrogen and phosphate imports. Due particularly to a strong increase in the centrally planned countries' surplus of production over consumption, the world potash balance will remain roughly constant at about 1 million tons from 1975/76 to 1980/81 (figure 2).

World potash capacity is expected to reach 36.3 million tons by 1980/81, an increase of 8.0 million tons, averaging nearly 4 percent annual growth between 1973/74 and 1980/81 (table 11). Most of the new capacity will be concentrated in North America, West Europe and particularly the Eastern Europe-USSR region, which together currently account for 95 percent of world potash capacity. The share of world capacity in North America will fall substantially from 35 percent to 29 percent as North America loses its dominance in the potash sector to Eastern Europe-USSR whose share will increase from less than 38 percent to 44 percent. Eastern Europe-USSR will account for two-thirds of the world's expected new potash capacity.

Late 1975 TVA potash capacity data roughly match the above estimates until 1979/80 when they are about 1.7 million tons larger. FAO/UNIDO/World Bank Working Group data from October 1975, in comparison to the earlier estimates above, suggest somewhat higher existing world potash capacity in 1974/75 and more rapid

growth to 1978/79, but a slightly reduced estimate of 1979/80 capacity. These revisions indicate a possible reduction in the positive balance by 1979/80.

The growth rate for expected capacity is less than for supply. Unlike phosphate and particularly nitrogen, meeting the above supply projections is based on improvement in capacity utilization from the relatively low levels of the recent past. Substantial improvement in capacity utilization is expected in all the major producing regions, lifting world capacity utilization from about 78 percent in 1973/74 to 88 percent in 1980/81. Failure to achieve these improvements in capacity utilization will adversely affect the future potash supply situation. Several major uncertainties exist, in particular (1) the speed and efficiency with which new potash mines can be opened and operated in the USSR; (2) the impact on potash production and investment of the potash reserves tax dispute in Saskatchewan where Canadian potash mines are located; and (3) the Saskatchewan government's recently announced plan to nationalize or expropriate potash mining interests.

The impact of the Saskatchewan nationalization plans is particularly important since Canada accounts for 40 percent of world potash exports, with the next largest exporters, the USSR and East Germany, each accounting for about 15 percent (table 12). The issue is especially critical for the United States, which buys about half the Canadian potash exports, because potash imports from Canada total roughly three-fourths of U.S. consumption. In addition, nearly two-thirds of the capacity expected to be nationalized is U.S. owned. Since Canada controls 43 percent of the world's proven reserves and perhaps 85 percent of all presently known potash resources, the nationalization decision may well have a strong long-term impact on future potash supplies and prices (table 13).<sup>33</sup> It could also discourage outside investment in Alberta, where much of the new nitrogen capacity depends on foreign investment.

If potash consumption were to grow at rates equaling the 1968/69 to 1973/74 period, it would easily surpass the expected available supply. Potash growth, reduced proportionally to the reduction in nitrogen growth, would result in a deficit balance after 1977/78. Potash consumption could grow somewhat more rapidly than expected in order to maintain the proper balance between nutrients. Thus, with the uncertainties on the supply side, and the possibility of higher than expected consumption, the potash situation

<sup>33</sup>Bureau of Mines, "Potash", a chapter from *Mineral Facts and Problems*, 1975 edition, preprint from Bulletin 667. Of course, reserve exploration and availability depends on prices, and potash prices have been relatively low, held down in part by excess capacity in Canada.



Table 10--Estimated potash fertilizer production, consumption, and balance in 1980/81

Region	1980/81 Million Metric Tons	Growth Rates-Percent		Share of Total-Percent		
		1968/69- 1973/74	1973/74- 1980/81	1968/69	1973/74	1980/81
<u>Developed Market Economies</u>						
Production	17.2	4.9	4.0	64.8	59.3	53.6
Consumption	15.1	6.1	3.2	61.2	57.9	51.2
Balance	2.1	--	--	--	--	--
<u>North America</u>						
Production	9.5	6.9	3.6	33.3	33.4	29.6
Consumption	6.9	8.3	3.3	25.2	26.3	23.4
Balance	2.6	--	--	--	--	--
<u>West Europe</u>						
Production	6.8	2.0	3.9	29.6	23.5	21.2
Consumption	6.7	4.6	2.9	29.9	26.3	22.7
Balance	0.1	--	--	--	--	--
<u>Oceania</u>						
Production	0.1	--	--	--	--	0.3
Consumption	0.4	8.5	4.2	1.4	1.4	1.4
Balance	-0.3	--	--	--	--	--
<u>Other Developed</u>						
Production	0.8	10.8	6.9	1.9	2.3	2.4
Consumption	1.1	--	4.7	5.4	3.8	2.7
Balance	-0.3	--	--	--	--	--
<u>Developing Market Economies</u>						
Production	0.6	--	10.4	--	1.4	1.9
Consumption	4.0	14.9	10.0	6.8	9.6	13.6
Balance	-3.4	--	--	--	--	--
<u>Africa</u>						
Production	0.4	--	4.2	--	1.4	1.2
Consumption	0.5	14.9	14.0	0.7	1.0	1.7
Balance	-0.1	--	--	--	--	--
<u>Latin America</u>						
Production	0.2	--	--	--	--	0.6
Consumption	1.8	12.5	10.4	3.4	4.3	6.1
Balance	-1.7	--	--	--	--	--
<u>Near East</u>						
Production	0.1	--	--	--	--	0.3
Consumption	0.1	--	--	--	--	0.3
Balance	0.1	--	--	--	--	--
<u>Far East</u>						
Production	--	--	--	--	--	--
Consumption	1.6	14.9	10.4	2.7	3.8	5.4
Balance	-1.6	--	--	--	--	--
<u>Centrally Planned Economies</u>						
Production	14.5	9.2	7.6	35.2	39.4	45.2
Consumption	10.4	9.2	5.2	32.0	34.9	35.3
Balance	4.0	--	--	--	--	--
<u>Asia</u>						
Production	0.2	--	--	1.3	0.9	0.6
Consumption	0.8	14.9	4.2	2.0	2.9	2.7
Balance	-0.7	--	--	--	--	--
<u>East Europe-USSR</u>						
Production	14.3	9.5	7.7	34.0	38.4	44.5
Consumption	9.6	8.8	5.3	29.9	32.1	32.5
Balance	4.7	--	--	--	--	--
<u>Total World</u>						
Production	32.1	6.8	5.5	--	--	--
Consumption	29.5	7.8	4.7	--	--	--
Balance	0.9	--	--	--	--	--

Source: 1980/81 from FAO, "Longer-Term Fertilizer Supply/Demand Position and Elements of a World Fertilizer Policy," AGS/F/75/7, May 1975, Commission on Fertilizers Second Session, Rome, June 3-7, 1975.



Table 11—Expected world potash capacity growth

(million metric tons of K<sub>2</sub>O)

Region	1973/74	1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81
Developed Market Economies .....	17.1	17.2	17.7	17.9	18.2	18.6	19.1	19.6
North America .....	9.9	9.9	9.9	9.9	10.1	10.2	10.4	10.6
West Europe .....	6.4	6.4	6.9	7.1	7.2	7.5	7.7	7.9
Oceania .....	--	--	--	--	--	--	0.1	0.1
Other Developed .....	0.8	0.8	0.9	0.9	0.9	0.9	0.9	1.0
Developing Market Economies .....	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.8
Africa .....	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Latin America .....	--	--	--	--	--	0.1	0.1	0.2
Near East .....	--	--	--	--	--	--	0.1	0.1
Far East .....	--	--	--	--	--	--	--	--
Centrally Planned Economies .....	10.7	11.2	11.6	12.3	12.8	13.3	14.4	16.0
Asia .....	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
East Europe-USSR .....	10.5	11.0	11.4	12.1	12.6	13.1	14.2	15.8
World Total .....	28.3	28.8	29.8	30.7	31.5	32.4	34.1	36.3

Source: FAO, "Longer-Term Fertilizer Supply/Demand Position and Elements of a World Fertilizer Policy," AGS:F/75/7, May 1975, FAO Commission on Fertilizers, June 3-7, 1975.

Table 12—Current world potash production and exports by major producers

(thousand metric tons)

Region <sup>a</sup>	Production (1974/75)	Percent of total	Exports (1973/74)	Percent of total
USSR ....	6,500	27	1,997	15
Canada ...	5,623	23	5,000	39
East Germany	2,865	12	1,830	14
West Germany	2,684	11	1,321	10
United States ..	2,371	10	859	7
France ...	2,082	9	760	6
Israel ....	607	3	427	3
China (PRC)	400	2	--	--
Spain ....	375	2	163	1
Congo Republic	263	1	1	--
Italy .....	165	1	21	--

<sup>a</sup> Congo exports included in French exports.

Source: British Sulphur Corporation, *Statistical Supplement*, No. 11, May/June 1975 for export data and No. 12, November/December 1975 for production data.

appears somewhat precarious in the medium term, particularly since new potash mines may require 5 years for development compared with 2 or 3 years for a new nitrogen or phosphate plant.

Table 13—World potash resources

(billion metric tons of K<sub>2</sub>O)

Region	Reserves	Percent of total	Other resources	Total resources
Canada ...	4.3	43	62.6	67.1
East Germany	2.4	25	2.4	4.9
West Germany	1.6	15	1.6	3.3
USSR ....	0.7	7	0.9	1.6
Israel and Jordan ..	0.2	2	0.9	1.1
United States ..	0.2	2	0.2	0.4
Other ....	0.2	2	0.4	0.6
Total World ..	10.0	--	69.1	79.0

Source: Bureau of Mines, "Potash," a chapter from *Mineral Facts and Problems*, 1975 edition, preprint from Bulletin 667, p.5.

## PHOSPHATE ROCK

Phosphate rock plays a vital role in world agricultural production. Phosphate accounts for nearly 30 percent of the world's fertilizer consumption, and its use in conjunction with other nutrients and on certain soils is often essential for high and rising crop yields. No known substitutes for phosphate rock exist from which phosphate fertilizers can be produced with existing technology in the quantity required to sustain world agricultural pro-

duction.<sup>34</sup> Phosphate rock production is concentrated in the United States, Soviet Union, and in the Northwest Africa-Near East, lead by Morocco. Between January and July 1974, Morocco nearly quadrupled phosphate rock export prices, and other

<sup>34</sup>Bureau of Mines, "Phosphate Rock," a chapter from *Mineral Facts and Problems*, 1975 edition preprint Bulletin 667, October 1975, p. 12.

exporters followed with similar large export price hikes. The price boosts paralleled the general fertilizer price situation in 1974. However, in 1975 phosphate fertilizer prices fell dramatically, but official phosphate rock prices remained at record levels. Increases for January 1976 were announced by U.S. exporters in mid-1975.<sup>35</sup> The phosphate rock situation to some extent resembles that of oil with relatively concentrated resources, production, and particularly exports of a vital commodity, with dominance centered in the same general region of the world.<sup>36</sup> However, phosphate rock price reductions seem likely in 1976. Recent reports indicate a significant reduction in Moroccan phosphate rock prices, particularly for shipments to West Europe.

## Current Situation

### Demand and Production

A strong increase in demand in 1974 caused heavy pressure on phosphate rock suppliers, and to a large extent enabled producers to set and maintain high rock prices. Production increases in 1974 slightly exceeded a boost in demand of about 12 million tons (product basis), but apparent consumption was still well above production. The basic shortfall of supply continued for the fourth consecutive year as producers met demand by reducing stocks (table 14). The inability of producers to match recent demand growth has been particularly evident in the United States and the Soviet Union, whose mining industries have been primarily concerned with meeting domestic requirements and have not maintained their share of supplies to world markets.<sup>37</sup>

Total world phosphate rock production reached 110.5 million tons in 1974, an increase exceeding 13

percent, well above the increase of about 9 percent in 1973 and the 1968 to 1972 growth rate averaging less than 5 percent annually. In 1975, demand slackened; preliminary data indicate that production by major producers during January - June remained at roughly 1974 levels, and in June - September declined over 11 percent.<sup>39</sup> Recent Bureau of Mines estimates indicate a 4 percent decline in world phosphate rock production in 1975 to 105.8 million tons.

### Trade

In 1974, world phosphate rock imports totaled 55.8 million tons, about half of total world production, and representing an increase of over 13 percent, roughly equal to the increase in 1973 (table 15). With the limited ability of the United States and the USSR to respond, most of the burden of meeting this strong import demand fell on producers in Northwest Africa and the Near East. In 1974 countries in those areas accounted for nearly 88 percent of the increase in world phosphate rock exports, with Morocco alone supplying 41 percent of the increase. The main force behind the strong demand for imports derived from fear that the price of phosphate rock would continue upward, coupled with anxieties of import-dependent phosphate fertilizer industries about the widely publicized production and logistics problems of major suppliers, and the industry's expectation of a continuation of the rapid phosphate demand growth during the early 1970's. Further reinforcing these fears were public statements by some international organizations and super-national authorities, such as FAO and government agencies, that criticized the industry for inhibiting developing country food production by not filling fertilizer demand.<sup>40</sup>

In 1975, phosphate rock import demand turned down sharply. Due in part to decreased exports, U.S. phosphate producer inventories (in production days equivalent) in October 1975 were about two-thirds above October 1974 levels, although still below the higher levels of 1972; that is, 88 days in 1975, compared to 53 in 1974, 82 in 1973, and 103 in 1972.<sup>41</sup> Between June and October alone, U.S.

Table 14—World phosphate rock supply and demand

	1970	1971	1972	1973	1974
	Million metric tons				
Production . . . . .	81.1	83.9	89.1	97.5	110.5
Demand <sup>1</sup> . . . . .	81.1	85.2	91.6	110.5	112.6
Balance . . . . .	--	-1.3	-2.5	-3.0	2.1

<sup>1</sup> Apparent consumption.

Source: British Sulphur Corporation, *Phosphorus and Potassium*, No. 76, March/April 1975, p. 3, except 1974 production is from British Sulphur Corporation, *Statistical Supplement*, No. 11, May/June 1975, p. 20.

<sup>35</sup>British Sulphur Corporation, *Fertilizer International*, No. 75, September 1975.

<sup>36</sup>Recent publicity on the situation includes "Phosphate: Taking a Leaf from Oil's Book," *New York Times*, November 9, 1975.

<sup>37</sup>British Sulphur Corporation, *Phosphorus and Potassium*, No. 76, March/April 1975, p. 3.

<sup>38</sup>See FAO, *Annual Fertilizer Review*, 1973, p. 47 for 1968 phosphate rock production.

<sup>39</sup>Based on preliminary data from the International Superphosphate Manufacturer's Association, Paris, October, 1975.

<sup>40</sup>British Sulphur Corporation, *Phosphorus and Potassium*, No. 75, September/October 1975, p. 5.

<sup>41</sup>The Fertilizer Institute, *TFI News*, December 5, 1975. In fact U.S. phosphate rock industry stocks fell steadily between 1970 and 1974, as indicated below, in million metric tons:

Year	1970	1971	1972	1973	1974
Stocks	13.2	10.8	9.5	6.9	5.2

Table 15—World phosphate rock trade

Region	1972		1973		1974	
	Exports	Imports	Exports	Imports	Exports	Imports
<i>Million metric tons</i>						
North America .....	12.6	2.7	12.6	3.2	12.9	3.7
West Europe .....	--	20.8	--	22.8	--	25.7
East Europe-U.S.S.R. ....	6.3	8.4	6.6	8.8	6.5	10.5
Oceania .....	1.9	2.7	3.1	4.3	2.8	4.1
Latin America .....	0.1	2.3	0.1	2.6	0.1	3.4
Africa .....	19.9	--	23.4	0.1	28.2	0.1
Asia .....	2.7	6.5	3.4	7.4	5.2	8.3
World total .....	43.4		49.2		55.8	

Source: British Sulphur Corporation, *Statistical Supplement*, No. 11, May/June 1975, p. 20.

producer inventories grew over 50 percent to 9.3 million tons.<sup>42</sup>

Preliminary data indicate total world phosphate rock exports during January-March 1975 were about 5 percent below a year earlier. During June-September, exports were only 41 percent of a year earlier.<sup>43</sup> In the United States relatively strong domestic demand from the new phosphoric acid capacity has enabled phosphate rock production to continue at high levels. However, the largest phosphate rock exporter, Morocco, uses only about 3 percent of its output domestically, and preliminary data for January-September indicate Morocco may have exported only about 14.2 million tons in 1975, down almost one-quarter from 1974.<sup>44</sup> The total decline for all exporters averaged 25 percent, led by declines of about 52 percent in Togo, 37 percent in Israel, and 32 percent in Tunisia. The United States had the second smallest decline, 6 percent, while only Spanish Sahara increased phosphate rock exports, by nearly 24 percent.<sup>45</sup>

### Structure of Phosphate Rock Production and Trade

World phosphate rock production is heavily concentrated in the United States, USSR, and Morocco

Source: Bureau of Mines, *Phosphate Rock*, preprint from Bulletin No. 667, p. 8.

<sup>42</sup>The Fertilizer Institute, *The Fertilizer Index*, June and October 1975. Production increased somewhat during the period. While June 1975 domestic disappearance was above 1974 levels, exports were well below 1974 levels.

<sup>43</sup>Preliminary 1975 data from the International Superphosphate Manufacturer's Association, October 1975.

<sup>44</sup>This assumes for 1975 an October-December decline from 1974 exports proportional to the 1975 January-September period (24.1 percent). The above assumptions, however, may somewhat overestimate exports, because the decline in the most recently reported June-September period was nearly 59 percent below 1974. Recent reports indicate Moroccan phosphate rock exports in 1975 may be as low as 13 million tons.

<sup>45</sup>This probably has a bearing on Morocco's well-known interest in Spanish Sahara.

which together account for over three-fourths of the total (table 16). In recent years, Morocco's share has grown somewhat, while that of the previously dominant United States has fallen. Between 1968 and 1974, the Moroccan share of world production rose from 13 percent to over 17 percent, while the Soviet Union's share increased slightly and the U.S. share dropped from nearly 47 percent to 38 percent. Further, major Near East and North and West African producers may be considered as, in effect, a production marketing unit, strongly influenced by Morocco.<sup>46</sup> Together these countries produced over 31 percent of the world's phosphate rock in 1974, compared with 25 percent in 1968. Thus, Morocco produces a significant share of the

Table 16—World production of phosphate rock in 1974

Country	Production in thousands of metric tons	Percent of total
United States .....	41,500	38
U.S.S.R. ....	22,540	20
Africa-Near East ..	35,720	32
Morocco .....	19,326	17
Tunisia .....	3,903	4
Togo .....	2,553	2
Spanish Sahara ..	2,386	2
Senegal .....	1,550	1
Jordan .....	1,600	1
South Africa ....	1,550	1
Israel .....	1,000	1
Algeria .....	802	1
Egypt .....	550	--
Syria .....	500	--
China .....	3,000	3
Nauru .....	2,288	2
Christmas Island ..	1,809	2
North Vietnam ...	1,200	1
Ocean Island .....	549	--
Other .....	1,546	1
World Total .....	110,476	

Source: British Sulphur Corporation, *Statistical Supplement*, No. 11, May/June 1975, p. 12.

<sup>46</sup>Countries included in addition to Morocco are Tunisia, Togo, Spanish Sahara, Senegal, Egypt, Algeria, Jordan, Israel, and Syria.



world's phosphate rock, and probably influences an additional large share.

Morocco, the third largest phosphate rock producer, is easily the largest phosphate rock exporter, alone accounting for over one-third of the world's rock exports in 1974 (table 17). The next largest producers, the United States and USSR, totaled 23 and 13 percent of the world's exports. Excluding U.S. exports to Canada and USSR exports to Eastern Europe as generally tied markets, Morocco is left with nearly 40 percent of the remaining available world export market for phosphate rock. Morocco plus other African and Near East exporters supply 55 percent of the world's phosphate rock exports. Some exporting regions are particularly dependent on African and Near East producers. They account for about 76 percent of rock imports into Western Europe and 58 percent into Eastern Europe. Europe has strong ties to African phosphate industry, which historically has depended on European money and technology. Western and Eastern Europe are the largest phosphate rock importing regions, together accounting for nearly two-thirds of the world's rock imports while producing very little themselves.

### Phosphate Rock Prices

In January 1974, Morocco raised phosphate rock export prices to \$42 per ton from \$14 per ton for high grade rock (table 18). By July 1974, Moroccan rock prices had risen further to \$68 per ton, a total increase of nearly 400 percent from January to July. Corresponding increases were announced by other principal exporters, except for the United

States which announced relatively lower price hikes. Posted export prices quoted by the Phosphate Rock Export Association (Phosrock), representing six major U.S. rock exporters, continued below those of other exporters in 1975, but with very little impact on world prices.

In mid-1975, Phosrock announced new prices effective January 1976 of \$58 per ton for 75/73 BPL rock and \$52 per ton for 72/70 BPL rock. However, world phosphate rock demand at the end of 1975 was very weak, and these prices for 1976 may not hold. In addition, recent reports indicate a substantial reduction in Moroccan official export prices, perhaps by 40 percent including discounts. With the historical interdependence between European phosphate manufacturers and Morocco, special prices for shipments to Europe are reported likely.

The phosphate rock price hikes, led by Morocco, occurred when all commodity prices were rising rapidly, and contrasted sharply with past price trends for rock which were generally stable. The negative impact of the high rock prices, particularly on export-oriented fertilizer manufacturers such as those in Europe, has reportedly been very severe, especially in combination with the declining phosphate fertilizer prices of 1975. Since about 2.5 tons of phosphate rock are required to produce a ton of triple superphosphate (recently bid below \$100 per ton), the difficulty of the export-dependent manufacturers is clear, even with the substantial informal discounting from listed prices which has reportedly occurred. The high rock prices have apparently reduced phosphate rock demand and stimulated investment in new mine capacity elsewhere.

Table 17—Source and destination of phosphate rock exports in 1974

(1,000 metric tons)

Source	Destination								Total
	North America	West Europe	East Europe	Africa	Latin America	Asia <sup>1</sup>	Oceania	Other <sup>2</sup>	
Africa-Near East .....	77	19,461	6,136	85	1,701	3,181	52	186	30,879
Morocco .....	--	11,515	4,575	--	1,280	1,268	52	--	18,690
Togo .....	28	2,400	--	5	--	200	--	--	2,633
Tunisia .....	--	1,396	752	--	259	--	--	--	2,407
Spanish Sahara .....	29	1,734	12	--	71	334	--	--	2,179
Senegal .....	--	1,608	--	--	15	--	--	176	1,799
Jordan .....	--	123	143	80	--	1,101	--	--	1,447
Israel .....	20	439	159	--	61	72	--	--	752
Algeria .....	--	120	268	--	--	11	--	--	399
Other <sup>3</sup> .....	--	126	227	--	15	195	--	10	573
United States .....	3,537	3,768	303	--	1,706	3,601	--	--	12,915
U.S.S.R.-North Vietnam .....	--	2,470	4,055	--	--	900	--	--	7,425
Other .....	70	30	--	--	5	393	4,081	--	4,578
World Total .....	3,684	25,728	10,494	85	3,413	8,261	4,133	372	55,797

<sup>1</sup> Includes Near East. <sup>2</sup> Includes "not specified" category. <sup>3</sup> Egypt, Syria and South Africa.

Source: British Sulphur Corporation, *Statistical Supplement*, No. 11, May/June, 1975, p. 18.

**Table 18—Moroccan and U.S. listed export prices for phosphate rock**

(U.S. dollars per metric ton)<sup>1</sup>

Country and grade	Feb. 1973	Jan. 1974	July 1974	Jan. 1975
Morocco				
75/77 TPL <sup>2</sup>	14.25	42.00	63.00	68.00
70/72 TPL	13.35	40.00	60.00	65.00
	Mar. 1973	Jan. 1974	July 1974	Oct. 1974
United States				
75/74 TPL	12.89	27.07	41.34	55.00
72/70 TPL	11.32	23.62	35.43	48.00

<sup>1</sup>FAS Casablanca or Safi for Morocco; FOB Tampa or Jacksonville for the United States. <sup>2</sup>Tri-phosphate of lime; bone phosphate of lime (BPL) in the United States.

Source: Office Cherifien des Phosphates for Morocco and the Phosphate Rock Export Association for the United States, quoted in M.R. Freeman, British Sulphur Corporation, a special report in the *Times* (London), May 27, 1975, p. 1.

## Outlook

### Expected Phosphate Rock Capacity

By 1980, world phosphate rock capacity is projected by the U.S. Bureau of Mines to total 173.2 million tons, up from 108.3 million tons in 1974 (table 19).<sup>47</sup> This increase of nearly 60 percent implies an average annual growth rate of over 8 percent, compared with a 4 percent increase in 1974. It is somewhat higher than the average annual capacity growth between 1969 and 1974. The share of world capacity for all three major producers will fall slightly; the United States to 36 percent, the Soviet Union to 19 percent, and Morocco to 16 percent. However, the share of the Africa-Near East countries will rise slightly as will that of many of the smaller developing country producers. This may indicate a trend toward increasing, though limited, locational dispersion of world phosphate rock production.

Total expected 1980 phosphate rock capacity appears roughly sufficient to meet expected 1980 phosphate rock consumption, based on estimated phosphate consumption totaling 33.1 million tons of P<sub>2</sub>O<sub>5</sub> in 1980/81.<sup>48</sup> This assumes rock will average at least 30 percent P<sub>2</sub>O<sub>5</sub>, 10 percent of world rock production will go for industrial use, 10 percent for technical losses, 85 percent mine oper-

<sup>47</sup>These estimates may be somewhat conservative. Data supplied by the Office Cherifien des Phosphates (OCP) of the Moroccan Government in late 1974 projected Morocco's exports of rock at nearly 31 million tons in 1980, which substantially exceeds the projection given in table 19 and neglects the large increase in domestic deliveries expected in Morocco.

<sup>48</sup>See table 8 above.

**Table 19—World phosphate rock production capacity**

(million tons)

Region	1973	1974	1980
United States . . . . .	40.2	40.8	62.6
U.S.S.R. . . . .	22.3	22.8	32.7
Africa-Near East . . . . .	31.8	34.2	58.6
Morocco . . . . .	17.4	19.0	27.2
Tunisia . . . . .	3.7	3.6	5.9
Togo . . . . .	2.4	2.4	3.0
Spanish Sahara . . . . .	1.8	1.8	9.1
Senegal . . . . .	1.8	1.8	2.3
Jordan . . . . .	1.2	1.2	2.7
South Africa . . . . .	1.4	1.6	3.2
Israel . . . . .	0.7	0.9	1.8
Algeria . . . . .	0.7	0.9	1.8
Egypt . . . . .	0.6	0.5	0.5
Syria . . . . .	0.1	0.5	1.1
China, Peoples Rep. . . . .	3.2	3.2	6.3
Nauru . . . . .	2.4	2.4	2.4
Christmas island . . . . .	1.6	1.6	2.0
North Vietnam . . . . .	0.5	0.8	1.4
Ocean Island . . . . .	0.8	0.8	--
Other . . . . .	1.2	1.5	7.2
World total . . . . .	104.3	108.3	173.2

Source: Bureau of Mines, "Phosphate Rock," a chapter from *Mineral Facts and Problems*, 1975 edition, p. 2.

ating rates, and about 1.2 million tons of ground rock used for direct application. This estimated growth in capacity is also sufficient to absorb the 5.4 percent probable average annual growth rate in world phosphate rock demand (3 percent in the United States, 6 percent for rest of world), which is used in the Bureau of Mines' projections.<sup>49</sup>

### Phosphate Rock Resources

Presently known world phosphate rock reserves total 16.1 billion tons, sufficient for about 43 years, assuming annual production growth at 5.4 percent (table 20). All estimated phosphate rock resources total 76.1 billion tons. Africa holds 72 percent of the world's phosphate rock resources, with Morocco and Spanish Sahara alone accounting for two-thirds of the total. Both technology and the extent of exploitable reserves, however, depend on prices. Recent high prices have reportedly stimulated interest in development of new mines.

The world's largest producers, the United States and the USSR, hold only about 14 percent and 4 percent of the world's resources, sufficient respectively for about 33 years and 22 years assuming annual production growth averaging 3 percent. However, if phosphate rock demand and production grow at the rates projected by the Bureau of Mines, the United States, for example, may cease to be self-sufficient in phosphate rock shortly after the year 2000 (figure 3). A similar but

<sup>49</sup>See Bureau of Mines, "Phosphate Rock," table 10, p. 15.

Table 20—World phosphate rock resources

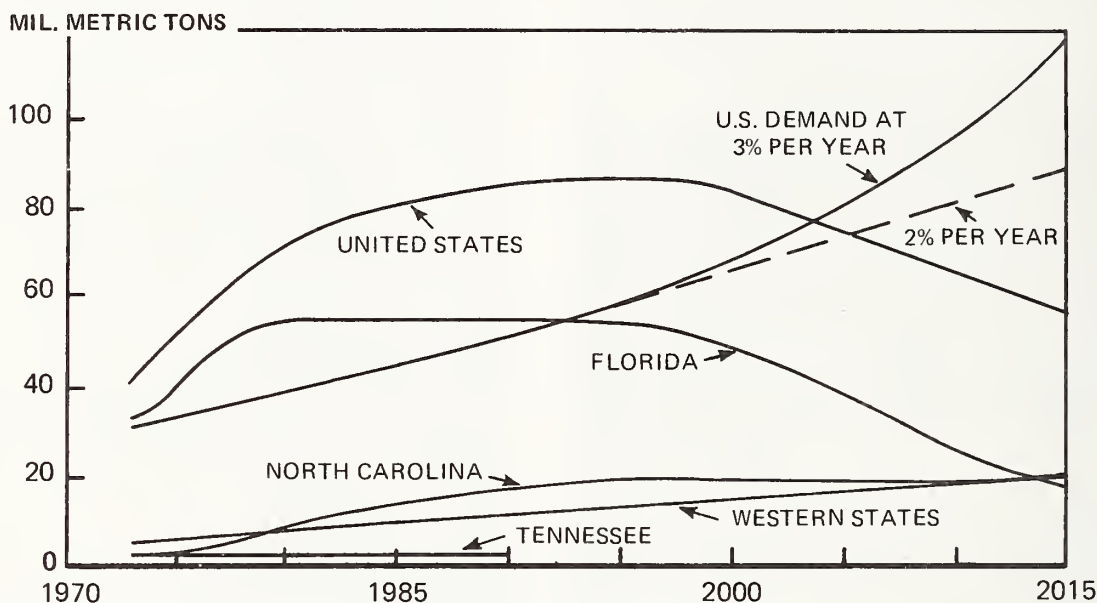
(billion metric tons)

Region	Known reserves <sup>1</sup>	Percent of total	Other resources <sup>2</sup>	All resources	Percent of total
United States .....	2.3	14	4.1	6.4	8
U.S.S.R. ....	0.7	4	2.9	3.6	5
Africa .....	11.6	72	49.0	60.6	80
Morocco .....	9.1 <sup>3</sup>	57	45.4	54.4	71
Spanish Sahara .....	1.5 <sup>4</sup>	9	1.8	3.4	4
Tunisia .....	0.5	3	1.4	1.8	2
Other Africa .....	0.6	4	0.4	1.0	1
Asia .....	0.3	2	1.8	2.1	3
Australia .....	0.9	6	1.8	2.7	4
Other .....	0.2	1	0.5	0.7	1
Total World .....	16.1		60.0	76.1	

<sup>1</sup> Estimated recoverable reserves at \$30.49 per metric ton for 70 BPL rock FOB Florida, the price fixed July 1, 1974 by the Phosphate Rock Export Association and effective when these

estimates were made, <sup>2</sup> Includes reserves recoverable at higher prices, with improved technology, etc., <sup>3</sup> Reserve may be as high as 36 billion tons. <sup>4</sup> Reserve may be as high as 9 billion tons.

## UNITED STATES PHOSPHATE ROCK SUPPLY-DEMAND PROJECTIONS



SOURCE: BUREAU OF MINES, U.S. DEPARTMENT OF THE INTERIOR

Figure 3

perhaps somewhat faster depletion of reserves seems likely for the USSR, and perhaps indicates the motivation for the Soviet agreement with a large U.S. firm to trade nitrogen fertilizers and potash for phosphoric acid, and the USSR negotiations with Morocco to develop a large mine in the Meskala region and port facilities in return for phosphate rock supplies (reportedly expected to reach 10 million tons annually).<sup>50</sup> Thus, the

growing role and dominance of Africa, and particularly Morocco, in world phosphate rock production and trade seems likely to continue, especially after the turn of the century. Control of Spanish Sahara could further enhance Morocco's already strong position. Further, Morocco's reported plans to add roughly 2 million tons of phosphoric acid capacity should broaden Moroccan influence in world markets for phosphate fertilizer, as well as for phosphate rock.

<sup>50</sup>See British Sulphur Corporation, *Phosphorus and Potassium*, No. 76, March/April 1975, p. 32. The need for phosphate rock may also be related to the recent Soviet

role in Angola, which reportedly holds large deposits of high quality rock.



## APPENDIX A: PROJECTIONS OF THE FAO/UNIDO/WORLD BANK WORKING GROUP ON FERTILIZERS

### Projections

The forecasts of capacity, demand and supply were prepared by the FAO/UNIDO/World Bank Working Group on Fertilizers in cooperation with representatives of USDA, TVA and fertilizer industry organizations in a meeting in Rome, 1 - 4 April 1975 (tables A.1, A.2, and A.3).

### Methodology <sup>51</sup>

#### Capacity

Estimates of capacity are based on existing capacities plus information as to new projects (new plants, mines and expansions) under construction or firmly committed (contracted and/or financing and raw materials secured) through the end of March 1975. Nitrogen (N) capacity is for anhydrous ammonia only, which, however, is the basis for well over 95 percent of nitrogenous fertilizer.  $P_2O_5$  capacity is for wet-process phosphoric acid only, which presently is the basis for about 60 percent of phosphatic fertilizers. Capacities of new ammonia and phosphoric acid plants were taken as their nameplate (rated) daily capacities multiplied by 330 days of yearly operation. Potash capacity is based on marketable production of potash minerals assuming 330 days of yearly operation.

#### Production and Available Supply

In order to arrive at estimates of available nitrogen supply for fertilizer purposes, estimates were first made of total production for all purposes. A sliding scale adjustment was applied to the capacity figures for new plants and expansions to compensate for capacity utilization which usually is very low initially, gradually improving over the phasing-in period of 2 to 3 years. Average capacity utilization of new nitrogen plants after this period was taken as 70 percent. In the case of phosphoric acid plants, 90 percent capacity utilization was assumed for the developed countries and centrally planned economies of Europe and 70 percent for developing countries and centrally planned economies of Asia after 3 years.

To arrive at the available supply of nitrogen for fertilizer purposes, deductions were made from pro-

duction to account for nitrogen used for non-fertilizer purposes, for process losses, and for losses in transportation, storage and handling.

Essentially the same procedure was adopted for phosphoric acid, except that regionally, no deduction was made for non-fertilizer uses in the developing countries and the centrally planned countries of Asia. Also, to arrive at total  $P_2O_5$  available for fertilizer purposes, the  $P_2O_5$  content of phosphatic fertilizers other than those based on wet-process phosphoric acid was added.

In the case of potash, available information was inadequate to adjust production regionally to arrive at supply available for agriculture. Thus, the regional figures are for production and not available supply. However, the world totals are adjusted to account for non-fertilizer uses and losses.

#### Demand

The demand forecasts in tables A.1, A.2, A.3 are based on what is expected to be the *effective* demand which takes into consideration the absorptive capacity of both farmers and countries. The absorptive capacity of farmers may be constrained by either or both their awareness of the benefits of using fertilizer or their ability to buy (involving both availability and price). Assuming adequate world supplies, the absorptive capacity of a country may be constrained by availability of foreign exchange and/or its ability to pursue a domestic agricultural policy (such as subsidies, price supports for agricultural products, etc.) which creates a favorable economic climate for fertilizer use. Although these considerations cannot be quantified, they are implicit in the demand forecasts. Also implicit in the forecasts is an assumption on prices which are assumed to stabilize below the recent peaks, but not approaching the very low levels of 1970/71.

The forecasts represent a consensus of the various participating organizations, all of which have, or have access to, extensive field organizations around the world. While trend projection may have been one of the tools used by the individual organizations, the forecasts are tempered by considered judgement based on extensive experience and knowledge of conditions in the various countries.

#### Regional Groupings

The grouping of countries used in the tables is on the basis of the United Nations economic and regional classification.

<sup>51</sup>Taken from FAO, "Longer-Term Fertilizer Supply/Demand Position and Elements of a World Fertilizer Policy," AGS:F/75/7, May 1975, Commission on Fertilizers, 2nd Session, Rome, June 3-7, 1975.

Table A.1--WORLD NITROGEN FERTILIZER SUPPLY, DEMAND AND BALANCE  
(Million metric tons of N)

	Reported		Estimate		Forecast			
	1973/74	1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81
<u>DEVELOPED MARKET ECONOMIES</u>								
<u>North America</u>								
Capacity	14.2	14.8	16.0	18.6	21.1	21.1	21.5	21.5
Supply 1/	10.1	9.9	9.8	10.6	12.2	12.7	12.9	13.1
Consumption 2/	9.6	9.8	9.6	10.1	10.6	11.2	11.7	12.2
Balance	0.5	0.1	0.2	0.5	1.6	1.5	1.2	0.9
<u>West Europe</u>								
Capacity	15.3	15.3	15.5	16.4	17.4	18.3	19.1	19.6
Supply	10.0	9.9	10.2	10.6	10.9	11.3	11.7	12.1
Consumption	7.9	8.1	8.4	8.8	9.2	9.6	10.0	10.4
Balance	2.1	1.8	1.8	1.8	1.7	1.7	1.7	1.7
<u>Oceania</u>								
Capacity	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Supply	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3
Consumption	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
Balance	--	--	--	--	-0.1	--	--	--
<u>Other Developed Market Economies</u>								
Capacity	4.4	4.6	4.7	4.7	4.7	4.7	5.0	5.0
Supply	2.4	2.7	2.7	2.7	2.8	2.7	2.7	2.6
Consumption	1.1	1.2	1.2	1.2	1.3	1.3	1.3	1.4
Balance	1.3	1.5	1.5	1.5	1.5	1.4	1.4	1.2
<u>Total Developed Market Economies</u>								
Capacity	34.2	35.0	36.5	40.0	43.5	44.4	45.9	46.4
Supply	22.7	22.7	22.9	24.1	26.1	27.0	27.6	28.1
Consumption	18.8	19.3	19.4	20.3	21.4	22.4	23.3	24.3
Balance	3.9	3.4	3.5	3.8	4.7	4.6	4.3	3.8
<u>DEVELOPING MARKET ECONOMIES</u>								
<u>Africa</u>								
Capacity	0.4	0.4	0.4	0.4	0.7	1.0	1.0	1.0
Supply	0.2	0.2	0.2	0.2	0.3	0.4	0.5	0.6
Consumption	0.4	0.5	0.5	0.6	0.7	0.7	0.8	0.9
Balance	-0.2	-0.3	-0.3	-0.4	-0.4	-0.3	-0.3	-0.3
<u>Latin America</u>								
Capacity	1.8	2.4	2.7	3.3	4.3	4.6	5.5	5.6
Supply	0.9	1.1	1.4	1.7	1.9	2.1	2.2	2.3
Consumption	1.8	2.0	2.2	2.4	2.6	2.8	3.0	3.2
Balance	-0.9	-0.9	-0.8	-0.7	-0.7	-0.7	-0.8	-0.9
<u>Near East</u>								
Capacity	1.5	1.7	1.8	2.3	3.3	4.5	4.8	5.6
Supply	0.7	0.9	1.0	1.2	1.4	1.9	2.4	2.6
Consumption	1.2	1.1	1.3	1.4	1.7	1.9	2.1	2.2
Balance	-0.5	-0.2	-0.3	-0.2	-0.3	--	0.3	0.4
<u>Far East</u>								
Capacity	3.7	3.9	4.7	6.7	8.5	11.2	13.0	13.2
Supply	2.2	2.1	2.6	3.4	4.2	5.2	6.1	6.7
Consumption	3.6	4.0	4.5	5.2	5.8	6.5	7.2	7.8
Balance	-1.4	-1.9	-1.9	-1.8	-1.6	-1.3	-1.1	-1.1
<u>Total Developing Countries</u>								
Capacity	7.4	8.3	9.6	12.6	16.8	21.3	24.3	25.4
Supply	4.0	4.3	5.2	6.5	7.8	9.6	11.2	12.2
Consumption	7.0	7.6	8.5	9.6	10.7	11.9	13.1	14.1
Balance	-3.0	-3.3	-3.3	-3.1	-2.9	-2.3	-1.9	-1.9
<u>CENTRALLY PLANNED ECONOMIES</u>								
<u>Asia</u>								
Capacity	4.8	4.9	5.0	6.5	7.7	8.7	9.7	9.9
Supply	3.0	3.4	3.6	4.1	4.8	5.5	6.0	6.5
Consumption	4.1	4.2	4.5	5.0	5.5	6.1	6.6	7.1
Balance	-1.1	-0.8	-0.9	-0.9	-0.7	-0.6	-0.6	-0.6
<u>East Europe and USSR</u>								
Capacity	16.1	17.3	19.4	20.6	20.8	21.9	25.0	25.5
Supply	11.3	11.7	12.4	13.2	13.6	14.0	14.4	15.5
Consumption	9.7	10.7	11.5	12.2	12.9	13.6	14.3	15.1
Balance	1.6	1.0	0.9	1.0	0.7	0.4	0.1	0.4
<u>TOTAL WORLD</u>								
Capacity	62.5	65.6	70.6	79.7	88.8	96.3	104.8	107.2
Supply	41.0	42.1	44.1	47.9	52.3	56.1	59.2	62.3
Available Nitrogen Supply 3/	39.2	--	--	--	--	--	--	--
Consumption	39.6	41.8	43.9	47.1	50.5	54.0	57.3	60.6
Balance	-0.4	-0.2	0.2	0.8	1.8	2.1	1.9	1.7

1/ North American 1973/74 and 1974/75 supply is adjusted for producer inventory changes in the United States. Preliminary data may underestimate U.S. supply in 1974/75 by 150,000 to 250,000 tons of nitrogen.

2/ Consumption in North America includes apparent consumption in the United States to accurately reflect the U.S. trade balance.

3/ Available supply in 1973/74 excludes 1.8 million tons to account for ammonia production in North and Central America exported for further processing, materials in transit, and transport and handling losses. Estimated supply is comparable to reported available supply.

Source: 1973/74 from FAO, Monthly Bulletin of Agricultural Economics and Statistics, April 1975 except North America includes USDA and U.S. Department of Commerce data for the United States. 1974/75 to 1980/81 from FAO, "Longer-Term Fertilizer Supply/Demand Position and Elements of a World Fertilizer Policy", AGS:F/75/7, May 1975, Commission on Fertilizers Second Session, Rome, June 3-7, 1975 showing estimates developed by the FAO/UNIDO/World Bank Working Group on Fertilizers, except North America 1974/75 data includes USDA and U.S. Department of Commerce data for the United States.

Table A.2--WORLD PHOSPHATE FERTILIZER CAPACITY, SUPPLY, CONSUMPTION AND BALANCE  
(Million metric tons of P<sub>2</sub>O<sub>5</sub>)

	Reported	Estimate	Forecast					
	1973/74	1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81
<b>DEVELOPED COUNTRIES</b>								
<b>North America</b>								
Phosphoric Acid Capacity	6.9	8.7	9.3	9.3	9.9	10.1	10.2	10.2
Phosphoric Acid Supply	5.6	5.9	6.3	6.9	7.2	7.4	7.6	7.7
Other P <sub>2</sub> O <sub>5</sub> Supply	1.1	1.0	1.0	0.9	0.9	0.8	0.8	0.8
Total Phosphate Fertilizer Supply 1/	6.8	7.1	7.3	7.8	8.1	8.2	8.4	8.5
Consumption 2/	5.5	5.4	5.4	5.7	6.0	6.3	6.6	6.8
Balance	1.3	1.7	1.9	2.1	2.1	1.9	1.8	1.7
<b>West Europe</b>								
Phosphoric Acid Capacity	5.0	5.4	6.4	6.4	6.4	6.4	6.4	6.4
Phosphoric Acid Supply	3.5	3.8	4.3	4.6	4.8	4.9	4.9	4.9
Other P <sub>2</sub> O <sub>5</sub> Supply	3.2	2.8	2.7	2.7	2.6	2.5	2.4	2.4
Total Phosphate Fertilizer Supply	6.7	6.6	7.0	7.3	7.4	7.4	7.3	7.3
Consumption	6.1	6.2	6.4	6.6	6.7	6.8	7.0	7.1
Balance	0.6	0.4	0.6	0.7	0.7	0.6	0.3	0.2
<b>Oceania</b>								
Phosphoric Acid Capacity	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Phosphoric Acid Supply	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Other P <sub>2</sub> O <sub>5</sub> Supply	1.4	1.4	1.3	1.4	1.4	1.4	1.4	1.4
Total Phosphate Fertilizer Supply	1.6	1.6	1.5	1.6	1.6	1.6	1.6	1.6
Consumption	1.6	1.6	1.6	1.6	1.6	1.7	1.7	1.8
Balance	--	--	-0.1	--	--	-0.1	-0.1	-0.2
<b>Other Developed Market Economies</b>								
Phosphoric Acid Capacity	1.2	1.4	1.4	1.9	1.9	1.9	1.9	1.9
Phosphoric Acid Supply	1.0	1.1	1.1	1.2	1.3	1.4	1.4	1.4
Other P <sub>2</sub> O <sub>5</sub> Supply	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Total Phosphate Fertilizer Supply	1.1	1.3	1.3	1.4	1.5	1.6	1.6	1.6
Consumption	1.1	1.2	1.2	1.2	1.3	1.3	1.3	1.4
Balance	--	0.1	0.1	0.2	0.2	0.3	0.3	0.2
<b>Total Developed Market Economies</b>								
Phosphoric Acid Capacity	13.3	15.8	17.3	17.8	18.4	18.6	18.8	18.8
Phosphoric Acid Supply	10.3	11.0	11.9	12.9	13.5	13.8	14.1	14.2
Other P <sub>2</sub> O <sub>5</sub> Supply	5.9	5.4	5.2	5.2	5.1	4.9	4.8	4.8
Total Phosphate Fertilizer Supply	16.2	16.6	17.1	18.1	18.6	18.7	18.9	19.0
Consumption	14.3	14.4	14.6	15.1	15.6	16.1	16.7	17.1
Balance	1.9	2.2	2.5	3.0	3.0	2.6	2.3	1.9
<b>DEVELOPING COUNTRIES</b>								
<b>Africa</b>								
Phosphoric Acid Capacity	0.7	1.0	2.0	2.4	2.9	2.9	2.9	2.9
Phosphoric Acid Supply	0.4	0.5	0.8	1.1	1.6	1.8	1.9	1.9
Other P <sub>2</sub> O <sub>5</sub> Supply	0.1	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Total Phosphate Fertilizer Supply	0.5	0.8	1.1	1.4	1.9	2.1	2.2	2.2
Consumption	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.5
Balance	0.2	0.5	0.7	1.0	1.5	1.7	1.8	1.7
<b>Latin America</b>								
Phosphoric Acid Capacity	0.8	0.9	1.3	1.7	1.7	1.7	2.0	2.0
Phosphoric Acid Supply	0.5	0.5	0.6	0.8	1.0	1.1	1.2	1.3
Other P <sub>2</sub> O <sub>5</sub> Supply	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3
Total Phosphate Fertilizer Supply	0.8	0.9	0.9	1.1	1.3	1.4	1.5	1.6
Consumption	1.4	1.5	1.6	1.7	1.8	1.9	2.1	2.2
Balance	-0.6	-0.6	-0.7	-0.7	-0.5	-0.5	-0.6	-0.6
<b>Near East</b>								
Phosphoric Acid Capacity	0.5	0.7	0.7	1.1	1.1	1.1	1.1	1.1
Phosphoric Acid Supply	0.2	0.3	0.4	0.6	0.6	0.7	0.7	0.7
Other P <sub>2</sub> O <sub>5</sub> Supply	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Total Phosphate Fertilizer Supply	0.3	0.5	0.6	0.8	0.8	0.9	0.9	0.9
Consumption	0.5	0.6	0.7	0.7	0.8	0.9	0.9	1.0
Balance	-0.2	-0.1	--	0.1	--	0.1	--	--
<b>Far East</b>								
Phosphoric Acid Capacity	0.7	1.0	1.1	1.2	1.3	1.5	1.5	1.5
Phosphoric Acid Supply	0.4	0.5	0.7	0.7	0.8	0.9	0.9	1.0
Other P <sub>2</sub> O <sub>5</sub> Supply	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Total Phosphate Fertilizer Supply	0.6	0.6	0.8	0.8	0.9	1.0	1.0	1.1
Consumption	1.2	1.4	1.5	1.6	1.7	1.8	2.0	2.2
Balance	-0.6	-0.8	-0.7	-0.7	-0.8	-0.8	-1.0	-1.1
<b>Total Developing Countries</b>								
Phosphoric Acid Capacity	2.7	3.5	5.0	6.4	7.0	7.2	7.5	7.5
Phosphoric Acid Supply	1.5	1.8	2.5	3.2	4.0	4.5	4.8	5.0
Other P <sub>2</sub> O <sub>5</sub> Supply	0.7	1.0	0.9	0.9	0.9	0.9	0.9	0.9
Total Phosphate Fertilizer Supply	2.2	2.8	3.4	4.1	4.9	5.4	5.7	5.9
Consumption	3.4	3.8	4.1	4.7	5.0	5.0	5.5	5.9
Balance	-1.2	-1.0	-0.6	-0.3	0.2	0.4	0.2	--
<b>Centrally Planned Economies</b>								
<b>Asia</b>								
Phosphoric Acid Capacity	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2
Phosphoric Acid Supply	--	--	--	0.1	0.1	0.1	0.1	0.1
Other P <sub>2</sub> O <sub>5</sub> Supply	1.5	1.9	1.2	1.3	1.3	1.3	1.3	1.3
Total Phosphate Fertilizer Supply	1.5	1.0	1.2	1.4	1.4	1.4	1.4	1.4
Consumption	1.6	1.6	1.8	1.9	2.0	2.1	2.2	2.3
Balance	-0.1	-0.6	-0.6	-0.5	-0.6	-0.7	-0.8	-0.9
<b>East Europe - USSR</b>								
Phosphoric Acid Capacity	4.6	5.8	5.9	6.0	6.0	6.0	6.0	6.0
Phosphoric Acid Supply	2.7	4.0	4.3	4.5	4.5	4.5	4.5	4.5
Other P <sub>2</sub> O <sub>5</sub> Supply	2.8	2.9	2.9	2.8	2.8	2.7	2.6	2.5
Total Phosphate Fertilizer Supply	5.5	6.9	7.2	7.3	7.3	7.2	7.1	7.0
Consumption	5.3	5.7	6.1	6.4	6.7	7.2	7.5	7.8
Balance	0.2	1.2	1.1	0.9	0.6	--	-0.4	-0.8
<b>Total World</b>								
Phosphoric Acid Capacity	20.8	25.4	28.3	30.4	31.6	32.0	32.4	32.4
Phosphoric Acid Supply	14.4	16.8	18.8	20.6	22.1	23.0	23.5	23.8
Other P <sub>2</sub> O <sub>5</sub> Supply	10.9	10.2	10.2	10.2	10.1	9.8	9.6	9.5
Total Phosphate Fertilizer Supply	25.4	27.8	29.2	31.0	32.4	32.8	33.3	33.3
Available Phosphate Supply 3/	24.6	--	--	--	--	--	--	--
Consumption	24.6	25.5	26.5	27.7	29.0	30.4	31.8	33.1
Balance	0.0	2.3	2.9	3.3	3.4	2.6	1.5	0.6

1/ North American 1973/74 and 1974/75 supply is adjusted for producer inventory changes in the United States.

2/ Consumption in North America includes apparent consumption in the United States to accurately reflect the U.S. trade balance.  
3/ Available supply in 1973/74 excludes 808,000 tons to account for technical phosphate production in several countries and transport and handling losses. Estimated supply is comparable to reported available supply.

Source: 1973/74 from FAO, Monthly Bulletin of Agricultural Economics and Statistics, April 1975 except North America includes USDA and U.S. Department of Commerce data for the United States. 1974/75 to 1980/81 from FAO, "Longer-Term Fertilizer Supply/Demand Position and Elements of a World Fertilizer Policy", AGS-F/75/7, May 1975, Commission on Fertilizers Second Session, Rome, June 3-7, 1975 showing estimates developed by the FAO/UNIDO/World Bank Working Group on Fertilizers, except North America 1974/75 data includes USDA and U.S. Department of Commerce data for the United States; centrally planned Asia includes supply data from World Bank, Fertilizer Requirements of the Developing Countries-Revised Outlook in 1975, Report No. 850, July 1975, Annex 2.



Table A.3--WORLD POTASH FERTILIZER SUPPLY, CONSUMPTION AND BALANCES  
(Million metric tons of K<sub>2</sub>O)

	Reported : Estimate :		Forecast					
	1973/74	1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81
<u>DEVELOPED COUNTRIES</u>								
<u>North America</u>								
Capacity	9.9	9.9	9.9	9.9	10.1	10.2	10.4	10.6
Supply	7.4	8.0	8.0	8.4	8.7	9.1	9.3	9.5
Consumption <sup>1/</sup>	5.5	5.1	5.3	5.5	5.7	6.0	6.5	6.9
Balance	1.9	2.9	2.7	2.9	3.0	3.1	2.8	2.6
<u>West Europe</u>								
Capacity	6.4	6.4	6.9	7.1	7.2	7.5	7.7	7.9
Supply	5.2	5.4	5.8	6.1	6.2	6.4	6.7	6.8
Consumption	5.5	5.7	5.8	6.0	6.2	6.3	6.5	6.7
Balance	-0.3	-0.3	--	0.1	--	0.1	0.2	0.1
<u>Oceania</u>								
Capacity	--	--	--	--	--	--	0.1	0.1
Supply	--	--	--	--	--	--	0.1	0.1
Consumption	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4
Balance	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
<u>Other Developed Market Economies</u>								
Capacity	0.8	0.8	0.9	0.9	0.9	0.9	0.9	1.0
Supply	0.5	0.6	0.7	0.7	0.7	0.8	0.8	0.8
Consumption	0.8	0.9	0.9	0.9	1.0	1.0	1.0	1.1
Balance	-0.3	-0.3	-0.2	-0.2	-0.3	-0.2	0.2	-0.3
<u>Total Developed Market Economies</u>								
Capacity	17.1	17.2	17.7	17.9	18.2	18.6	19.1	19.6
Supply	13.1	14.0	14.5	15.3	15.7	16.3	16.8	17.2
Consumption	12.1	12.0	12.3	12.7	13.2	13.6	14.3	15.1
Balance	1.0	2.0	2.2	2.5	2.5	2.7	2.5	2.1
<u>DEVELOPING MARKET COUNTRIES</u>								
<u>Africa</u>								
Capacity	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Supply	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4
Consumption	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.5
Balance	0.1	0.1	0.1	--	--	-0.1	-0.1	-0.1
<u>Latin America</u>								
Capacity	--	--	--	--	--	0.1	0.1	0.2
Supply	--	--	--	--	--	0.1	0.1	0.2
Consumption	0.9	1.1	1.2	1.3	1.4	1.5	1.6	1.8
Balance	-0.9	-1.1	-1.2	-1.3	-1.4	-1.5	-1.5	-1.7
<u>Near East</u>								
Capacity	--	--	--	--	--	--	0.1	0.1
Supply	--	--	--	--	--	--	0.1	0.1
Consumption	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Balance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
<u>Far East</u>								
Capacity	--	--	--	--	--	--	--	--
Supply	--	--	--	--	--	--	--	--
Consumption	0.8	0.1	1.0	1.2	1.3	1.4	1.5	1.6
Balance	-0.8	-0.1	-1.0	-1.2	-1.3	-1.4	-1.5	-1.6
<u>Total Developing Countries</u>								
Capacity	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.8
Supply	0.3	0.3	0.3	0.3	0.3	0.4	0.5	0.6
Consumption	2.0	2.3	2.5	2.9	3.1	3.4	3.6	4.0
Balance	-1.7	-2.0	-2.2	-2.5	-2.8	-3.0	-3.2	-3.4
<u>CENTRALLY PLANNED COUNTRIES</u>								
<u>Asia</u>								
Capacity	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Supply	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Consumption	0.6	0.7	0.7	0.7	0.7	0.8	0.8	0.8
Balance	-0.4	-0.5	-0.5	-0.5	-0.6	-0.6	-0.6	-0.7
<u>East Europe &amp; USSR</u>								
Capacity	10.5	11.0	11.4	12.1	12.6	13.1	14.2	15.8
Supply	8.5	9.3	10.3	11.1	11.8	12.2	13.2	14.3
Consumption	6.7	7.1	7.5	8.0	8.4	8.8	9.2	9.6
Balance	1.8	2.2	2.8	3.1	3.4	3.4	4.0	4.7
<u>TOTAL WORLD</u>								
Capacity	28.3	28.8	29.8	30.7	31.5	32.4	34.1	36.3
Supply	22.1	23.8	25.3	26.8	28.0	29.0	30.6	32.1
Available Supply <sup>3/</sup>	20.9	22.6	23.9	25.3	26.4	27.4	29.0	30.3
Consumption	21.4	22.0	23.0	24.2	25.5	26.6	28.0	29.5
Balance	-0.5	0.6	0.9	1.1	1.0	0.9	1.0	0.9

1/ North American 1973/74 and 1974/75 supply is adjusted for producer inventory changes in the United States.

2/ Consumption in North America includes apparent consumption in the United States to accurately reflect the U.S. trade balance.

3/ Available supply is 95% of the world supply to account for non-fertilizer use and losses.

Source: 1973/74 from FAO, Monthly Bulletin of Agricultural Economics and Statistics, April 1975 except North America includes USDA and U.S. Department of Commerce data for the United States. 1974/75 to 1980/81 from FAO, "Longer-Term Fertilizer Supply/Demand Position and Elements of a World Fertilizer Policy", AGS/F/75/7, May 1975, Commission on Fertilizers Second Session, Rome, June 3-7, 1975 showing estimates developed by the FAO/UNIDO/World Bank Working Group on Fertilizers, except North America 1974/75 data includes USDA and U.S. Department of Commerce data for the United States.

Table B.1--Preliminary current fertilizer consumption data for major countries

	Nitrogen			Phosphate			Potash		
	1973/75	1974/75	Percent change	1973/74	1974/75	Percent change	1973/74	1974/75	Percent change
	(Thousand metric tons of nutrients)								
Major Developed									
United States	8,307	7,796	-6	4,625	4,077	-12	4,611	4,005	-13
Canada <sup>1/</sup>	541	508	-6	499	485	-3	239	238	--
France	1,833	1,555	-15	2,152	1,711	-20	1,819	1,413	-22
West Germany	1,101	1,201	+9	917	877	-4	1,163	1,171	+1
United Kingdom	874	904	+3	478	332	-31	498	488	-10
Italy	672	680	+1	472	300	-36	267	260	-3
Spain	716	748	+4	481	512	+6	265	256	-3
Netherlands <sup>1/</sup>	412	415	+1	123	120	-2	114	120	+5
Belgium	165	170	+3	166	155	-7	193	190	-2
Norway	85	89	+5	52	56	+8	70	74	+6
Japan	821	873	+6	793	657	-17	685	733	+7
Australia	176	178	+1	1,171	600	-49	159	104	-35
U.S.S.R.	6,256	6,750	+8	2,699	3,620	+34	3,605	3,710	+3
Poland	1,069	1,150	+8	847	850	--	1,413	1,550	+10
Total Major Developed	23,028	23,017	--	15,475	14,352	-7	15,101	14,272	-5
Total Major Developing Market	15,703	15,117	-4	11,929	9,882	-17	10,083	9,012	-11
Major Developing									
China <sup>2/</sup>	3,815	4,162*	+9	1,390	1,215*	-13	528	704	+33
India	1,835	1,773	-3	634	478	-25	314	339	+8
Brazil <sup>1/</sup>	408	336	-18	948	903	-5	623	538	-14
Mexico	531	595	+12	181	202	+12	36	52	+44
South Korea	411	510	+24	196	232	+18	150	156	+4
Turkey	430	420	-2	280	304	+9	13	19	+46
Pakistan	342	361	+6	58	60	+3	3	3	--
Philippines	146	176	+21	45	51	+13	45	60	+33
Bangladesh	122	81	-34	44	34	-23	11	11	--
Columbia	154	140	-9	100	67	-33	58	65	+12
Iran	154	190	+23	97	148	+52	1	1	--
Total Major Developing Countries	8,348	8,744	+5	3,973	3,694	-7	1,782	1,948	+9
Total Major Countries	31,376	31,761	+1	19,448	18,046	-7	16,883	16,220	-4
Total Major Market	20,236	19,699	-3	14,512	12,361	-15	11,337	10,256	-10
Total World <sup>3/</sup>	38,657	39,044*	+1	24,255	22,557*	-7	20,686	19,859*	-4
Total Market Countries	24,870	24,124*	-3	17,408	14,797*	-15	13,368	12,031*	-10

Note: \*denotes ERS estimates; --denotes less than  $\pm 0.5$  percent.

<sup>1/</sup> FAS reported data differ from FAO data for 1973/74 for Canada, Netherlands, Brazil and Iran, and are used to maintain data consistency.

<sup>2/</sup> China (PRC) for 1974/75 is based on estimated percent change from 1973/74 FAO base data.

<sup>3/</sup> 1973/74 Total World and Total Market Countries are taken from FAO, Annual Fertilizer Review, 1974; 1974/75 data is calculated from 1973/74 assuming proportional changes in the same direction as the total country data supplied.

Source: Based on unpublished FAS agricultural attaché reports submitted in May and updated in November 1975, and ERS estimates. U.S. data is taken from USDA, SRS, Commercial Fertilizers, November 3, 1975. Except for U.S., Canada, Netherlands, Brazil and Iran, 1973/74 data are the same as that reported in FAO, Annual Fertilizer Review, 1974.

## LIST OF TABLES

<i>Table</i>		<i>Page</i>
1	Current world nitrogen fertilizer supply, consumption, and balance . . . . .	10
2	Ending June inventories of U.S. nitrogen fertilizer producers . . . . .	11
3	Current world phosphate fertilizer supply, consumption, and balance . . . . .	12
4	Ending June inventories of U.S. phosphate fertilizer producers . . . . .	13
5	Current world potash fertilizer supply, consumption, and balance . . . . .	14
6	Estimated nitrogen fertilizer production, consumption, and balance in 1980/81 . . . . .	16
7	Expected world nitrogen capacity growth . . . . .	17
8	Estimated phosphate fertilizer production, consumption, and balance in 1980/81 . . . . .	19
9	Expected world phosphoric acid capacity growth . . . . .	20
10	Estimated potash fertilizer production, consumption, and balance in 1980/81 . . . . .	22
11	Expected world potash capacity growth . . . . .	23
12	Current world potash production and exports by major producers . . . . .	23
13	World potash resources . . . . .	23
14	World phosphate rock supply and demand . . . . .	24
15	World phosphate rock trade . . . . .	25
16	World production of phosphate rock in 1974 . . . . .	25
17	Source and destination of phosphate rock exports in 1974 . . . . .	26
18	Moroccan and U.S. listed export prices for phosphate rock . . . . .	27
19	World phosphate rock production capacity . . . . .	27
20	World phosphate rock resources . . . . .	28
A.1	World Nitrogen Fertilizer Supply, Demand and Balance . . . . .	30
A.2	World Phosphate Fertilizer Capacity, Supply, Consumption and Balance . . . . .	31
A.3	World Potash Fertilizer Supply, Consumption and Balances . . . . .	32
B.1	Preliminary current fertilizer consumption data for major countries . . . . .	33

### *Figure*

1	Export Prices for Some Major Fertilizer Materials . . . . .	5
2	Estimated World Fertilizer Supply and Consumption . . . . .	17
3	United States Phosphate Rock Supply-Demand Projections . . . . .	28





UNITED STATES DEPARTMENT OF AGRICULTURE  
WASHINGTON, D.C. 20250

---

OFFICIAL BUSINESS  
PENALTY FOR PRIVATE USE, \$300

POSTAGE AND FEES PAID  
U.S. DEPARTMENT OF  
AGRICULTURE  
AGR 101  
FIRST CLASS

